The British Journal of Educational Psychology

(Incorporating the "Forum of Education")

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Volume VIII

1938

Issued on behalf of the
BRITISH PSYCHOLOGICAL SOCIETY and the TRAINING COLLEGE ASSOCIATION
by The British Journal of Educational Psychology, Ltd.

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JOHNSON REPRINT CORPORATION
111 Fifth Avenue, New York, N. Y. 10003

JOHNSON REPRINT COMPANY LIMITED
Berkeley Square House, London, W. 1

First reprinting, 1964, Johnson Reprint Corporation

British Journal of Educational Psychology.

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VOLUME VIII. FEBRUARY 1938. PART I.

THE DRIVES WHICH DETERMINE THE CHOICE OF A CAREER.

BY MAGDALEN D. VERNON.
(*From the Cambridge Psychological Laboratory*).

PART II.

(*b*) *Cases actuated by drives other than social conformity.*

CLASS C.—The individuals grouped in this class showed other strong drives; they are therefore sub-divided into groups corresponding to their main drive or drives.

Humanist, humanitarian.—The individuals in whom this drive seemed to function strongly closely resembled each other in the absence of any outstanding conflict with the social conformity drive. Most social groups approve of the existence in women of this drive, at least in most of the forms in which it functions (but cf. G1 and K1 below), and therefore encourage it. Thus the individual who possesses this drive is not likely to meet with much social opposition, unless the drive is very strongly developed and functions very actively, when she may encounter the type of opposition given to Florence Nightingale and Josephine Butler. But in such people the human sympathy drive is probably so strong as altogether to outweigh the social conformity drive.

It is of course difficult in practice to draw any hard and fast line between these individuals and those who are attracted to their fellows chiefly by gregariousness and desire for social conformity and social approval. The different drives are rarely distinguished by the individuals themselves. But it seemed possible to detect the humanist humanitarian drive functioning in some of the wishes and interests described, sometimes as a genuine interest in human problems, individual or general, and sometimes rather as sympathy for and desire to help and protect anyone who needed it.

Among the former was G5. She thinks she might have liked to read economics because of her interest in modern problems; is interested in people and social life, and also in social work; reproaches her undergraduate acquaintances because they are so keen on the latest scientific discovery and invention, but never pause to think if these are " any use "; would have liked to be a politician; is interested in educational theory in connection with social questions and politics; wants to take up adult education and possibly be a Board of Education inspector. She is also fond of small children, and enjoyed looking after them on a " Fruiting Campaign."[1]

P1 also enjoyed being on a " Fruiting Campaign," but more on account of the companionship of the other " campaigners," and of the pickers. She wants to go into the Civil Service, preferably the Ministry of Labour, because she likes dealing with people, is " interested in methods of handling different people," and in observing " how they have been affected by their environment and upbringing " ; is not " violently keen on a career as such," but definitely " wants to do something useful for other people."

There is quite a definite group of students who particularly like working with small children or else with the sick.

Thus G1 and K1 both wanted when at school to take up nursing, but later decided to do medicine ; (this seems to have been to some extent a result of social pressure, medicine presumably being considered a more desirable occupation). Both hope to specialize in work with children when qualified. G1 was also very interested in Dr. Barnardo's Homes when a child.

G2 and B7 intend to teach because they are fond of children. G2 liked looking after small children on the " Fruiting Campaign," and thinks she will enjoy dealing with children when teaching. B7 prefers rather older children ; when at school she liked organizing games and Guide activities among the younger children ; has been organizing games for elementary school children while at college ; thinks it will be interesting to teach mathematics to children " because it can be related to other things " in their everyday life.

L4 is " very fond of babies " ; has taken part in the " Fruiting Campaign," looked after babies in a German family, taught arithmetic to a farmer's child one holiday, worked with a Guide company in a nearby village, looked after the younger children at school. She is, however, a person of various activities and intellectual interests, with strong political and religious views ; and at present wishes to take up adult education as affording a wider field for the propagation of those views. She may be said to afford a good example of both aspects of the drive, that of interest in human problems and that of desire to help and protect.

Activity and Independence.—The drives towards freedom and activity are so frequently linked in these students in a drive towards independent " self-activity " that they are considered together. In some cases they did not conflict with the social conformity drive, when they were not very strong, or when they functioned in a socially approved form.

N2 intends to be a Labour Manager in a factory, and ultimately hopes to be a Factory Inspector ; she likes social work for itself, because it gives an opportunity for doing something active and " constructive " ; she wanted to do something original and different from her family, who are all teachers; is interested in industry and the people in it, and in factories and machinery.

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[1] The " Fruiting Campaign " is an organization of undergraduates, male and female, who undertake for a period of a few weeks to look after the children of the gangs of fruit pickers while the latter are out picking in the fields and orchards.

K2 goes in for a variety of activities and enjoys term because it gives her the opportunity of " doing the things she wants to be doing "; she wants to go on doing research work—" to do something in connection with her subject "—but would also quite like to teach because of " the joy of getting other people interested in the things she has enjoyed."

But there were also a number of cases in which a more or less marked conflict was apparent; the drive towards self-activity, or towards freedom pure and simple, conflicted with an evident drive towards the obtaining of social approval from some social group or groups. The group whose approval was aimed at differed in different cases; so also did the attitude towards it, and the nature of the conflict.

J1 very much wants to lead an independent life, have a career, and do independent original work; she has been very keen on her subject, classics, and now hopes to carry it on by doing research work in classical archaeology. But she got tired of living in college, " disliked institution meals "; doesn't want to teach because she hates " pumping knowledge into people who don't want it."

B6 is characterized by a dislike of the ordinary type of social contact and obligation, and a desire to determine the type of contact she experiences. Thus she likes the " great freedom of action " of university life and the opportunity of organizing her own activities which is " less possible in a society with fewer rules " (i.e., in ordinary life); likes many social contacts with people whom she can see if she wants to, but can also avoid, if she doesn't want intimate intercourse with them; intends to become a librarian, because she " wants to get into contact with people in a way that would be impossible in teaching "; and teaching is " such a tremendous responsibility."

In the case of L1 the battle between the drives towards self-activity and social conformity has never really been joined; she has always been too docile to stand out in order to gain her wishes. She has been " strictly brought up," is " used to doing what she is told," " feels at a loose end " when left alone, " likes to be given set work to do " and not work by herself, and " feels the lack of being organized " at the university. While at school, she gave up doing science, which she liked, and changed to modern languages, for which she had no particular enthusiasm, because home and school authorities persuaded her that there was " no future for her " in doing science, except teaching. At one time she wanted to be an artist, at another to go into musical comedy; this still attracts her but she realizes it is impossible, " her family would never hear of it "; she would like to do something creative, something " expressive." As a compromise between (or a flight from) the drives towards self-activity and taking a socially acceptable occupation, she has thought of going into a travel agency; she wants to go about and see the world.

In the case of R1 there is an outstanding conflict, with no present sign of solution. She has always wanted to do research; she likes " doing experiments and getting results from them"; "likes using her hands"; wants to work on something of "practical importance," such as plant diseases; thinks it would be "thrilling to find out something new." On the other hand, she has a very strong desire for human companionship (she has been, and still is, very much tied to her mother, who is an invalid). She enjoys the company very much at college, was always lonely before, because the other girls at school didn't like her, and at home her brother and sister played together and left her out. She is also very fond of little children, but doesn't want to teach because she thinks she "hasn't the right qualities for it." Thus in her case there appears to be a considerable conflict between the desire for independent activity and freedom from her mother's wishes, and for social contacts, social approval and human sympathy.

In the case of M1, the conflict is also marked. She disliked school intensely; "people always wanted her to do things she disliked," and she was despised by the other girls because they were cleverer than she was and "thought her queer." She very much enjoys college life and also her work in theology; she likes working alone; would like to stay up another year and do research work; would like adult teaching or social work, but not school teaching because she dislikes being in "a purely feminine institution" and would hate to be "kept down" as she was at school.

B3 was also teased at school; is fond of her family but sometimes feels they "get on top of her"; likes college on the whole, but gets irritated by college regulations and also "gets rather tired of her contemporaries" and the social activities she carries on with them. However, she wants to teach in order to get active experience and get to understand people's minds; but her real passion is to write poetry, and some "active experience" is necessary to enable her to do that.

W3 again lacked contact with the girls at school because she hated games, and therefore compensated for this by choosing out and endeavouring to succeed in activities as widely different from them as possible. She passed from one violent intellectual enthuasiasm to another (Archæology, Egyptology, Greek, Philosophy, English literature, modelling and painting), and has now become much interested in theology, and hence in religious education, and in social and educational work in general.[1] Moreover, the desire to fly from one interest to another has been partly replaced by the satisfaction of mental discipline" and the desire to do a "hard job" provided it has some degree of intellectual and emotional satisfaction. On the face of it, her solution of the conflict between independent thought and activity, and social contact and recognition (a conflict which occurs almost inevitably with individuals of outstanding intelligence and originality) appears more satisfactory than with the other students to whom we have referred.

Power.—We may consider next examples of the importance of the power-seeking drive—those who wish to dominate over their social environment or in some way reorganize it. We may distinguish between those individuals who wish to be socially acceptable in so doing, who desire the people with whom they are dealing to accept and acquiesce in these arrangements; and those who prefer to stand out from and to some extent be independent of the society they rule or organize. The former constitute what is sometimes called the "public-school type," who readily accept responsibility, disciplinary duties, the organization of social activities. They are actuated not necessarily by a desire for personal power but often by a wish to exercise the power derived from their membership of a ruling group, thus combining conformity and domination. This often appears as a love of discipline and of enforcing laws and regulations.

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[1] She wants to begin by teaching Scripture and English in a school; this might "lead on to training college work, inspecting, social work, combined social and educational work."

Thus W1 did a lot of organizing work at school in connection with prefect duties, and also keeping discipline; finds things "too free and easy" (too little "working to a time-table") at the university, which is therefore "not a good training for ordinary life"; is a member of the Fascist Club; wants to teach, at any rate for a time, but not to go to a training college, because "either one can teach or one can't" and "the best experience is being a junior mistress."

B1 also did a lot of organizing work and exercised much responsibility at school. At the university she has developed an interest in Constitutional History and International Law; she used to belong to the Education Society, but gave it up because it became too Communistic. She is very keen to teach because she feels that there are "tremendous possibilities in moulding the minds of young people."

I1 was always interested in history because she wanted to find out "how government worked"; she took a large share in school organizing, prefect duties, running school clubs, organizing games, Guides, etc.; and has continued the same type of activity at the university; intends to do welfare work and later become a factory inspector; had also thought of political work and might do some when she was older.

By contrast with these students, B4 has rather stood aside from the accepted forms of power and responsibility. She was considerably isolated at school, "liked to be let alone," was never a prefect or "anything like that"; but liked running a Girl Guide troop of elementary school girls because among them she felt she was "some one." She enjoyed organizing musical activities, getting up groups of people to sing, conducting them; would like to continue this type of work—rehearsing, conducting, musical organization, adult teaching; likes "making things alive for people and feels she can do it"; doesn't want to do school teaching because she hates the routine and would be afraid of "getting into a rut"; doesn't want to marry but to do a "thoroughly active job for twelve hours a day for the rest of her life." Thus in B4 self-activity, independence, superiority, and domination seem to be equally strong, and to be in harmony with each other and with her choice of a career.

Thus in none of these cases is there real conflict between the power drive and the social conformity drive. B4 seems to be less actuated by the latter than do the other three students and in her case social conformity may be weak enough to offer little resistance to the functioning of the power and independent self-activity drives. It is more probable, however, that some conflict did exist while she was at school; but at the university these drives were enabled to function in forms so socially acceptable that the social conformity drive encountered no opposition. This state of affairs also probably exists in the cases of W1, B1, and I1.

Superiority and Social Admiration.—These two drives also frequently functioned together. Among those who wish to stand out from and be superior to their social environment we again find those who seem to be fairly successful in this respect because their superiority is of a socially acceptable type; while others are less successful, either because of unusual difficulties in their environment, or because their peculiar qualities or drives are somehow at variance with it.

Among the former, H2, who is possessed of considerable social charm, used to enjoy doing a lot of acting, elocution, and debating at school, but now prefers discussions with friends on literary and dramatic criticism; wants to teach because it is a " responsible job " and " one can do something useful in it "; would like to run a boarding school of her own, where she could try out her own ideas. In point of fact, H2 might on some grounds be placed with the dominating individuals, except that her social manner gave the impression that she valued superiority and admiration more than power.

S3 was also very keen at school on debating, singing on speech days, acting and writing plays for production in school, running a modern languages society; until she was sixteen thought she would like to teach because she would " love to stand up and talk to the class "; but now feels she " hasn't enough patience " to do it and is also " afraid of getting into a rut," so is trying for the Civil Service.

B5 presents a case of a more aggressive type of superiority drive. She thought the other girls at school " all right on the whole, but some of them were rather ' mental ' "; the staff " fussed her rather "; when she first came up she didn't like college because the others seemed superior—she came up " feeling inferior because she only got in at the last moment "; she has always wanted to teach, but not to become a " school-marm " (they have such " undesirable characteristics "), and will " take strong measures not to revert to type "; she thinks she can manage children, but likes boys better than girls because the latter " all get together in a clique and giggle "; she wants to start with a job in a good school. She referred to her " domineering nature," but the above remarks seem to show more desire for superiority and outstandingness than for actual power.

F1 is also an aggressive individual, and requires social approval of her superiority. She has always been keen on acting and also enjoys organization; she was happy at school where they " encouraged her," while at home she was " nagged at "; now she prefers home life, where she is independent, to college life because she finds the college authorities " interfering and tactless "; they treat her like a child, whereas at the end of her school life (after she had been abroad for a time) she had been " treated as a grown up." She was greatly annoyed at having got a bad examination class. She declined to go into the family business as her father wished, and intends to teach; she likes children and " likes getting things across to them "; if she is good at it, she will be sorry to give it up for marriage; on the other hand, she regards marriage as a career and a " full-time job," because it is " much better to look after one's home and children oneself." Thus clearly she greatly desires success and outstanding superiority, and also a certain amount of power over others, together with complete freedom from their authority, and even from obligation towards them (she " likes having the people she likes when she wants them.")

In the case of W2, the desire for a particular mode of gaining superiority and social admiration could not be realized, but it seems to have been more or less successfully diverted into other channels. She has always been very keen on acting, and done a great deal at school and at the university; she has organized acting; and most of her friends are also interested in it; until the end of her first year at the university she wanted to go on the stage, but then realized that she didn't act well enough to become a first-class actress, or get anything better than a repertory job, and she had no desire for this. She now intends either to be a journalist, or to go into a big London shop and work her way up; she wants to " find out what people will buy " and feels confident she could sell them the clothes it " really suits them to wear." She will also keep up amateur acting. Thus her desire for excelling and for admiration, which was impossible to gratify directly, has taken a partially sublimated form.

M3 was also very keen on acting, elocution, dancing, and music at school; when she was younger she " lived her plays," and her first choice was acting and reciting poetry; but her interests have now turned more to drama and dramatic poetry in themselves. She is very anxious to study the drama both theoretically and practically (i.e., in the theatre) and eventually to write drama and poetry. She used to be " very ambitious to have a career " but is now much less so—" other people seem so efficient, it is difficult to reach their standard." But she wishes to transmute her experience in life and reconstruct it in the shape of drama and poetry. Here there is an original artistic bent, and desire for self-expression seems to have been used formerly as a means of excelling and winning admiration; but these desires have become less strong and the desire for artistic creation stands by itself.

In the case of L3, the ruling drives seem to be partly towards outstandingness in artistic expression and partly towards exercise of power. The impossibility of satisfying the former drive has led to the choice of an occupation which may give expression to the latter. Her principal desire was to become a professional singer; but at college she has also spent much time in conducting and musical organization, and would like to continue this sort of thing too. Since these occupations are financially impossible, she " feels she doesn't mind what she does," as long as it gives her some opportunity for musical activities in her spare time. She has tried teaching and couldn't bear it; and is going to take up hotel management (suggested by her father); she feels she " might as well become a managing woman," though she has always feared developing into one; and is quite interested in domestic work. She would like to run a hotel of her own. But she is also very anxious to get married. It is interesting to compare her with B4 (see p. 5), whose intelligence, personality, and strength of drive to independence and domination are probably a good deal stronger, and who therefore seems more likely to gratify her desire for combined artistic expression and exercise of power.

Pleasure, Ease, etc.—Those individuals whose predominant drive appeared to be that towards pleasure or amusement seemed to show a comparatively small measure of social conformity. This does not mean that they shunned social activity; one at least of them was immersed in it. But the social group was regarded apparently as a provider of pleasure and amusement; if it ceased to perform this function satisfactorily, it was rejected and another group or another type of life selected in its place. There is no indication in the following statements that the students were driven to modify their activities to conform to those of the group.

G3, a medical student, seemed to spend her life in a whirl of social activity and gaiety (of pure amusement, not moral or intellectual uplift); most of the scientific subjects she had studied seemed interesting at first, but later were thought to be " dull " or " unpractical "; she seems to have chosen to do medicine because she liked science, but not physics and chemistry; thinks she might become a G.P. because that " may be lucrative once one gets going"; doesn't want to go to a Bristol hospital because " Bristol would be an awful hole to live in," whereas Manchester might " provide good social activities and entertainments."

C1 changed from history to science while at school because she thought the latter would provide better openings in life; but changed back to history after doing science for a time at the university because she felt it would be " fun to change and do something different " and she never had a great interest in natural science; would like most of all to travel when she goes down, and not stay in one place; wants to do " something new and interesting " (not teaching); but wants to get a fairly well-paid job, and one in which " one thinks and uses one's mind "; doesn't want to do secretarial work because she mightn't get an interesting job.

C2 has changed about from one occupation to another in search of something congenial. She liked school when younger, but the higher forms bored her; left school and did a secretarial course for a year; thought of taking up Art; went to India for a year; did science at a technical college because she wanted to qualify for better jobs, and a science degree was easier to get than an arts degree; decided to come to the university; decided to read medicine; belonged to several societies but gave them up because she got bored with them; is now getting bored with college life; finds the medical educational outlook narrow, " purely scientific, not clinical "; changes her mind as to what branch of medicine to take up, when qualified, as she talks to different people about different branches.

Thus in these cases a lack of satisfaction with and ability to adjust themselves to the environment seem to produce a kind of will-o'-the-wisp search for something more congenial.

IV.—THE DISTRIBUTION AND INTER-RELATIONSHIP OF THE DRIVES.

Any estimation of the frequency of occurrence of any of the drives which have been described must of necessity be only approximate. Some of these drives occur with great force and clearness in numerous persons, others in comparatively few. The absence of positive evidence of the existence of these, or of any other possible drives,[1] cannot be taken to prove their non-existence in the individual in question. But the following discussion is confined mainly to the frequency and inter-relationship of those drives which are strong and are clearly manifested.

In the first place we may observe, as was noted above, that there is some evidence in every case pointing to the operation of the *social conformity* drive. In 77 per cent of the students it was strong or very strong; and in the remainder, moderately strong. In point of fact, probably no one is entirely deficient in the drive towards contact and relationship with his fellows; and this must necessitate a certain tendency to conform to their behaviour and desires, since otherwise contact would be impossible. But we have already seen that different types of behaviour occurred according to the relationship of the social conformity drive to other drives and to differing character traits. In the individuals in Class A it quite outweighed in importance any other drives, though in some individuals it was reinforced by a strong activity drive. In those in Class B there was some blockage, which we attributed either to innate deficiencies of intelligence or temperament; or to difficulties created by faulty upbringing, which prevented it from functioning freely. In those in Class C it was combined with or outweighed by other drives.

The *humanist, humanitarian* drive was on the whole individual rather than universal, but was fairly widely distributed. In its aspect of generalized interest it appeared strongly in 55 per cent of cases, and in the protective, sympathetic aspect in 28 per cent (with much overlapping of cases). It would be a mistake to give too much weight to these relative figures, for the following reasons: in the first place, the two aspects are difficult to differentiate clearly, though we have tried to include in the second category only those who showed some definite "feeling" of sympathy, protectiveness, etc. This "feeling" obviously will appear less clearly in the remarks and statements made in an interview of this kind than will a generalized interest with its much greater and more clearly conscious cognitive content. Also, the protective sympathetic form of the drive may itself consist of a complex of different drives, impossible to analyse here, each with its different form of manifestation. Again, we have already remarked that social approval of the human interest form of the drive is strong in undergraduate society; protectiveness is in general less overtly approved. Consequently the protective aspect may be disguised and overlaid in these reports by a consciously intellectualized interest in human and social problems. Finally, though in many cases the interest form is basic, in some cases it is probably a mere manifestation of social conformity to the current fashion. This is less likely to occur with true protectiveness.

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[1] We have already alluded to the absence of any discussion of the sex drive. Though the great majority of these students stated either directly or indirectly that they wanted to get married (ultimately, not immediately, as a rule), it was impossible to determine how far this desire was actuated by a sex drive, and how far by the conformity, security, pleasure, and humanitarian drives (see this *Journal*, Vol. vii, pp. 307-8). Nor was the influence of the sex drive actually apparent in determining the choice of any other career, though it may have functioned in the cases where the social admiration drive was noted.

We may note next the great frequency of the drive towards *activity*, and the scarcely lesser frequency of the drive towards freedom and independence. The activity drive appeared to be strong or very strong in 85 per cent of students. The drive was most forcibly expressed by B4 who wanted "a thoroughly active job for twelve hours a day for the rest of her life"; and W1 who would "hate to go home and be at leisure"; "wants to use her brains in some way"; "would miss having a lot to do." Several others said that they would "hate just to live at home and do nothing." And the great majority answered in the affirmative the question, "Are you keen on having a career?" It is easy to understand why evidence for this drive should be so clear. In the first place, most of these students are livelier, more intelligent, and more full of "go" than the average woman of this age. In the second place, the traditions of undergraduate life are all in favour of a ceaseless round of varied activity; thus the operation of this drive is greatly facilitated by social approval, and reports relating to its functioning are readily given. Thirdly, women students are as a rule greatly encouraged while at school and at college to give free expression to this activity drive by directing it towards some future career; hence the tendency to say that one is "keen on having a career" is also facilitated. One or two interesting exceptions to this strong tendency towards activity may be noted: T1 who has "no great desire to do anything in particular" because she has been so much over-driven; A1 who is at loggerheads with life in general, and enjoys working principally because it is her chief refuge from other forms of activity; P2 who is like a fish out of water in her present environment and really desires simply an ordinary married life.

The frequency and strength of the *independence* drive is also remarkable; it appeared to be strong or very strong in 75 per cent of the students. Often it was not easy to differentiate from the activity drive; these two drives appeared to be combined in a strong drive towards independent self-activity. It was noted earlier in this paper that this drive did not appear so clearly in the upper social classes as in the lower ones. But in contradiction to this, it was very marked in these students, for the following reasons: a woman student's life characteristically gives a foretaste of freedom and independence without the full measure thereof. She is released from parental and school control, but still has to conform to certain rules and regulations. Consequently she often enjoys more freedom than she has previously experienced, but yet is not thrown entirely on her own resources. Thus she enjoys the pleasures of freedom without its responsibilities. B5 commented on this, saying that she liked the opportunity of organizing her own activities which " is less possible in a society with fewer rules " ; while W1 thought that " things were too free and easy " at the university, which was therefore " not a good training for ordinary life." On the other hand, a large number expressed their enjoyment of the unaccustomed freedom of college life. It is possible that many of the students did not realize that full independence is not always and altogether enjoyable, and were thus inclined to rate it more highly than they would do after further experience. A number of them were disinclined to teach because they thought it might involve " getting in a rut " ; many were anxious to go on working after marriage, and a large majority to continue to enjoy other outside interests, apparently in the desire for independent activity. Those who did not show any great drive towards independence all exhibited strong or very strong tendencies towards social conformity, either of the accepting or of the more aggressive type. This confirms the opinion already advanced— that there may be a strong antithesis between the drives towards independent activity and towards conformity.

The drive towards *security* occurred less frequently than that towards freedom; it appeared to be strong in 40 per cent of cases. The two drives were not, however, of necessity mutually incompatible; 23 per cent of cases showed evidence of possessing both strong security and strong independence drives. It was pointed out above that the former drive is on the whole less clearly marked among those from the upper social classes, among whom the prospect of insecurity is less familiar and pressing than it is among the lower social classes. Thus it did not appear as the main or dominating drive in any of the cases described above, although a number of students stated or implied that they were anxious to obtain a " good, safe, job " when they went down from the university. Had many of these students been faced by an immediate prospect of real insecurity of livelihood, the operation of the security drive might have appeared more clearly. As it was, the required " safety " was quite often constituted as much by the recognized social status of the occupation as by its guarantee of regular employment. (Thus L2 said she wanted a " safe, recognized job, such as teaching.") In these cases the student really desired a job in which she could if she wished exercise independent activity, while at the same time enjoying the guarantee of recognized social status. This is of course a characteristic of most professional occupations, as contrasted with business, commercial, and secretarial occupations (especially for women) ; hence the desirability of the former.

The relative infrequency of appearance of the *pleasure* drive is probably also the result of social influences in this group. Only 28 per cent of the students showed it at all strongly, and in the majority of cases direct evidence of its operation was almost completely lacking. But, as we have pointed out, this drive is not approved in the professional classes, especially the academic and scholastic. Consequently, it would not have been encouraged in the majority of these students, and would be unlikely to show up clearly in their answers even when it existed.

The *superiority* and *power* drives should probably be distinguished from most of those previously described in that they are naturally individual in their occurrence. Thus in certain cases they appear strongly and clearly, while in others they do not appear at all. Forty-seven per cent of the students showed evidence of strong superiority drives, 36 per cent of strong power drives. It was pointed out above that the superiority drive was likely to function among people who were rather outstanding in intelligence and initiative. Such individuals are often set apart at school from other girls and encouraged to be ambitious and to excel in every way. Going to the university becomes a sign and assurance of superiority (see B5's remarks on p. 6) ; so also is the aim at entering a profession, particularly a profession like the Civil Service (Administrative) which is difficult to enter (see S3, p. 6). Thus any natural tendency to superiority drive is socially facilitated. The power drive, on the whole, is not so much approved in university life (though cf. the comment on B4, p. 5) ; but it may have been considerably facilitated during the later years of school life by the exercise of authority and responsibility in the school (see particularly I1, p. 5). But the drive towards the exercise of personal, rather than socially maintained, power probably does not become operative until the beginning of the adult stage, towards the end of the university career. It seems likely that the power and superiority drives tend to work together. Indeed it may be that they mark two aspects of one and the same drive towards aggressiveness and assertiveness. On the one side the drive may find satisfaction merely in excelling one's fellows ; on the other it may require a practical acknowledgment of this superiority expressed in deference to one's authority.

The *social admiration* drive was difficult to recognize and differentiate from conformity on the one hand and superiority on the other. There were only seven clear-cut examples (15 per cent of all students). Thus clearly this drive is an individual rather than a universal possession. It is probable that in these cases there was also a strong superiority drive, but that the individual required that her superiority should be socially recognized and admired. There were several examples of superiority drive in which social admiration was not important. The social admiration drive is not one which has been greatly encouraged among girls of this social type ; it might appear far more clearly and frequently in other social groups.

V.—SUMMARY AND CONCLUSIONS.

It appeared to the author that in general the individual's choice of a career or occupation in life, even if guided by a knowledge of his specific abilities and of the qualifications which the occupation appears to demand, is motivated by certain main underlying drives or tendencies to action. These function in determining many other of his interests and pursuits, as well as his career. Consequently if he be encouraged by suitable questions to describe these pursuits and his reasons for following them, as well as for his choice of career, his replies and his manner of answering may throw some light indirectly upon the nature and functioning of these drives.

As a preliminary to the main enquiry along these lines, made among women university students, a tentative scheme of possible drives was drawn up by means of the information given in answer to enquiries about the interests of girls and young women ; these enquiries were made from a number of women who had much experience in dealing with women and girls.

The students were then interviewed, each for a period of half an hour to an hour. Questions relating to interests, etc., were asked; and many of the answers were found to demonstrate indirectly the operation of drives such as those suggested by the preliminary enquiry.

The students appeared to fall into three main classes according to their dominant drives. The first two of these were almost entirely dominated by the social conformity drive, which, however, produced rather different types of behaviour in the two classes. In those in the third class other drives were as strong as, or stronger than, social conformity; and in some cases came sharply into conflict with it. The functioning of the following drives was illustrated: humanist, independence, and activity, pleasure, power, superiority and admiration. The first of these was much less likely to conflict with social conformity than were the others. In both the preliminary and the main enquiries it was shown that the frequency and importance, as well as the manner of functioning, of these drives were related to the social environment of the individual.

It is impossible from a brief enquiry such as this to draw up any scheme of relationships between the dominating drives of an individual and his choice of a career. But from the records given it appears that different drives could operate in different individuals to produce the choice of one and the same career. Also, the same, or very similar, drives could result in different individuals in the choice of very different careers. To determine any causal relationship between drive and career, far more knowledge of individual character is necessary. This paper is intended merely to suggest a possible line of enquiry.

My thanks are due to Professor Bartlett and Mr. Eric Farmer for their advice and helpful suggestions as to this work; to those women mentioned in Section II who spared some of their often very limited time to give me so much valuable information; and to the students who voluntarily submitted themselves to undergo questioning.

RÉSUMÉ.

DES IMPULSIONS QUI DÉTERMINENT CHEZ L'INDIVIDU LE CHOIX D'UNE CARRIÈRE.

Chez l'individu son choix d'une carrière ou d'un emploi, même s'il est influencé par une connaissance de ses aptitudes et de celles que semble exiger l'emploi, est ordinairement motivé par certaines impulsions, ou tendances à l'action, fondamentales. Celles-ci fonctionnent aussi à déterminer chez lui beaucoup d'autres intérêts et occupations. Par des questions appropriées des étudiantes d'université

furent encouragées à décrire ces intérêts et occupations et leurs raisons pour les poursuivre, aussi bien que pour leur choix d'une carrière. Les réponses montrent, dans les cas divers, l'influence des impulsions suivantes : la conformité au milieu social, l'activité humaniste ou humanitaire, l'indépendance, le plaisir, le pouvoir, la supériorité, l'admiration. Les étudiantes semblaient se partager en trois groupes principaux : les deux premiers de ceux-ci étaient dominés presque exclusivement par l'impulsion de la conformité, laquelle, cependant, produisait dans les deux groupes des types assez variés de comportement. Chez les étudiantes du troisième groupe d'autres impulsions étaient aussi fortes, sinon plus fortes, que celle de la conformité ; chez quelques unes elles menaient à de vifs conflits avec celle-ci. Il était moins probable que l'impulsion humaniste luttât avec cella de la conformité. La fréquence et l'importance de ces impulsions, aussi bien que leur façon de fonctionner, furent rapportées au milieu social de l'individu.

ZUSAMMENFASSUNG.

DIE TRIEBE, DIE DIE WAHL DES BERUFS BESTIMMEN.

Im allgemeinen wird die Wahl eines Berufs oder einer Laufbahn im Leben, auch wenn sie von der Kenntnis spezifischer Fähigkeiten und der Veranlagungen, die der Beruf anscheinend verlangt, geleitet wird, durch gewisse zugrundeliegende Haupttriebe oder Tendenzen zur Handlung verursacht. Diese funktioneren dadurch, dass sie gleichzeitig viele andere Interessen und Vorlieben bestimmen. Man regte Universitätsstudentinnen durch passende Fragen an, diese Interessen und Vorlieben und die Gründe, aus denen sie sie verfolgten, und die Gründe ihrer Berufswahl zu beschreiben. Die Antworten zeigten in verschiedenen Fällen die Wirkung folgender Triebe : soziale Anpassung, humanistische oder humanitäre Tätigkeit, Selbständigkeit, Freude, Macht, Überlegenheit, Bewunderung. Die Studentinnen schienen sich in drei Hauptgattungen zu teilen : die beiden ersten wurden fast ausschliesslich vom sozialen Anpassungstrieb beherrscht, der aber ziemlich verschiedene Typen von Benehmen in den beiden Gattungen hervorrief. In jenen der dritten Gattung waren andere Triebe ebenso stark wie oder noch stärker als die soziale Anpassung und kamen in einigen Fällen in scharfen Konflikt mit demselben. Es war weniger zu erwarten, dass der humanistische Trieb mit sozialer Anpassung in Konflikt geraten würde als die anderen Triebe. Die Häufigkeit und die Bedeutung dieser Triebe sowohl wie die Art der Funktion wurden in Beziehung gesetzt zu der sozialen Umgebung des einzelnen Menschen.

A PSYCHOLOGICAL STUDY OF MATHEMATICAL ABILITY, WITH SPECIAL REFERENCE TO SCHOOL MATHEMATICS.

BY HILDA W. OLDHAM.

PART II.

VI.—SUGGESTED BONDS BETWEEN MATHEMATICAL ABILITIES.

The appended diagram is an attempt to denote what seem to be the chief bonds between the mathematical abilities discussed.

The factor common to arithmetic and geometry, holding algebra and general intelligence constant, seems to be that to do with number. There must be a general application of number to geometry. As already quoted, some children are interested in finding the number of degrees in an angle, or the numerical relation between certain lines. These children may have no interest in geometry when number is not involved. I had instances of this. Gradually, however, because of this connection between geometry and number, children who are interested in number and who can do arithmetic are able to become sufficiently interested in geometry to do parts of it tolerably well.

This connection between arithmetic and geometry is denoted on the diagram by the letter N.

The factors common to geometry and algebra when arithmetic and general intelligence are held constant (letter A in the diagram) may be said to be due to:

(*a*) Those principles in geometry and algebra connected with area; e.g., $(a+b)^2=a^2+2ab+b^2$ viewed algebraically by simple multiplication of $a+b$ by $a+b$.

Viewed geometrically, this principle is stated thus:

> If a line be divided into any two parts the square on the whole line is equal to the sum of the squares on the two parts together with twice the rectangle contained by the parts.

In teaching the solution of quadratic equations by completing the square, the writer observed two different attitudes on the part of the children.

The child normally good at geometry, in many cases, would make a little drawing of the theorem to help her to complete the square. Sometimes the children would look up from their books, stare into space, and then complete the square correctly.

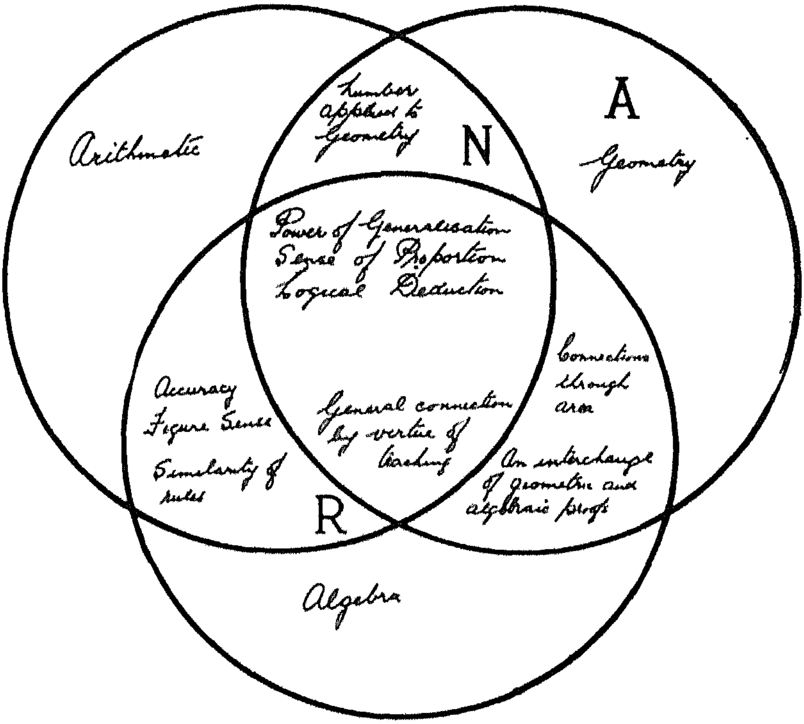
" I am looking at that $(a+b)^2$ figure in my head," one child remarked.

Others distinctly bad at, or indifferent to, geometry, always put down $(a+b)^2 = a^2+2ab+b^2$ at the top of their page, and if they could substitute letters by numbers they were successful in completing the square.

(*b*) An interchange of algebraical and geometrical proofs; e.g., Pythagoras is proved in some schools algebraically.

Some teachers of mathematics object to such proofs on the grounds that they fail to foster the right geometric sense.

Diagram Indicating the Relationships between Arithmetic, Algebra and Geometry.



The connections between arithmetic and algebra when general intelligence and geometry are held constant are denoted in the diagram by the letter R. They are described as due to:

(*a*) *The need for accuracy in both arithmetic and algebra.*

Dr. William Brown found that accuracy in arithmetic correlated with accuracy in algebra to extent of ·69.

A child who seldom makes a mistake in the mechanical processes in arithmetic will be more likely to be accurate in the mechanical parts of algebra when and if he has mastered the new rules involved.

(*b*) *Figure sense.*

There is a great deal of numerical work in algebra as well as in arithmetic.

As we have seen some children enjoy dealing with numbers. They find much more satisfaction in dealing with the square symbol a^2 than with □. The index expressed as it is by a number is easier and pleasanter for them to manipulate than the square represented by lines and right angles.

(*c*) *Similarity of rules.*

This speaks for itself. When the difficulty of the algebraic symbols has been mastered there is little difficulty in applying the rules of arithmetic to algebra. This is especially the case in schools where negative numbers have been introduced into arithmetic.

Many teachers introduce algebra by means of the self-evident formulæ in arithmetic, such as Area=Length times Breadth, put as $a=lb$, and by substitution algebra is begun.

The connections between all three named in the diagram by the letters X Y Z seem to depend on:

(*a*) *Power of generalization.*

As is well known, every branch of mathematics involves some degree of generalization. People who can argue readily from the particular instance to the general are more likely to do so in the medium of any branch of mathematics than those people who are unable to generalize about anything.

(*b*) *Logical deduction.*

It is not suggested that a mathematical proof is a simple "juxtaposition of syllogisms." The syllogisms must be placed in a certain order, and the art of mathematical solutions is the ability to see the whole of the argument at a glance. But the ability to deduce simple conclusions, the ability to reason in simple media, is a quality of general intelligence, and is an aid in solving mathematical problems in all branches.

(*c*) *General connection by virtue of teaching.*

(1) It is usual for the three subjects to be taught by the same teacher. This fact in itself introduces a common element into the children's performances in all three subjects. The teacher is often a kind of symbol of the subject of mathematics. When the boy thinks of arithmetic, Mr. X,

the mathematics master, comes to his mind, and through his thoughts of Mr. X come floating into his mind a maze of algebraic symbols and geometric figures, all welded together in the thought of Mr. X, the symbol of them all.

If Mr. X has a strong personality as a teacher his insistence on attention, on neatness, on good home work, on "thinking before you speak," on honesty in all work, on good clear statements, may bring a common element of "doing one's best" into all branches of mathematics. He may encourage intelligent questions, he may inspire by his obvious enjoyment of teaching and of the subject.

He may bring the element of play, fun, exploring, and satisfaction into all his lessons.

In such a teacher's classes it will become the fashion to like mathematics, and this attitude will form a very powerful element of interest in all three branches.

(2) Arithmetic, algebraic, and geometric methods are often applied to the same problem. One branch is used to explain another; e.g., in teaching square root in arithmetic, algebra is brought in to demonstrate the rule, and often geometry figures are employed as well.

In very early stages in algebra, $2x$ is explained as a line twice any length x; x^2 as a square on a line of any length x, whose area is $x \times x$, a knowledge gained in the arithmetic lesson. A cube is shown to explain x^3. So in the beginnings of algebra teaching we draw from arithmetic and geometry in our explanations.

There arises in the minds of the children a feeling of similarity in connection with these three branches of mathematics.

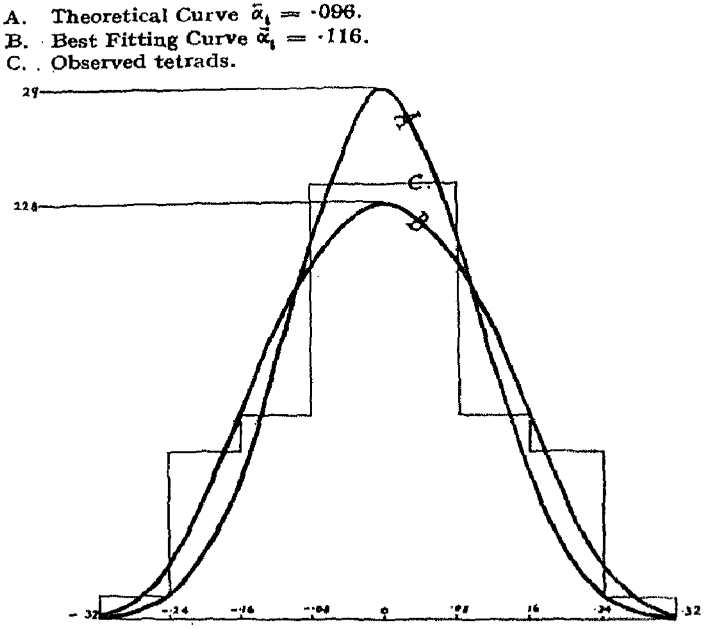
Some, probably most, children distinguish sharply between the three branches, liking one, disliking another, but at the same time they dub them all as mathematics and accept this link of similarity.

It is common in mathematics teaching to show an algebraic and geometric way of solving the same problem, and still more common to interchange arithmetic and algebraic solutions of the same sum. Therefore, in any paper set on arithmetic, say, it is very difficult to exclude questions that may involve the use of the other two. So we see how this common method of interchanging mathematical tools provides another general connection between these three branches of mathematics.

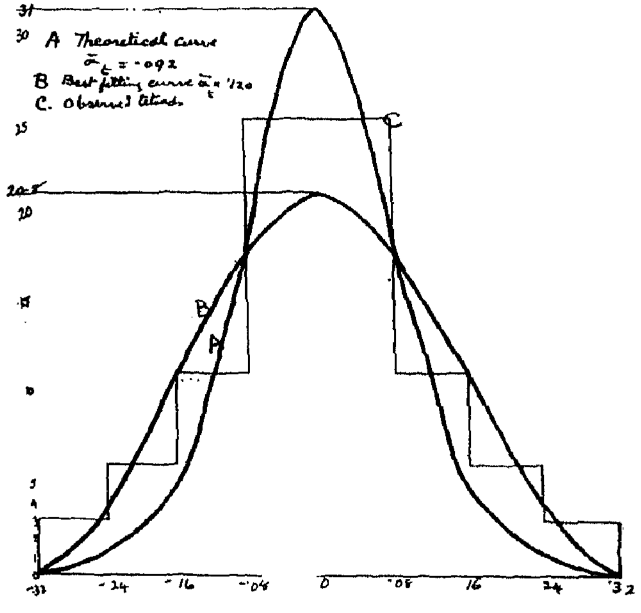
Some teachers in answer to the questionnaire noticed a tendency for a pupil's marks to get more nearly equal in the three branches of mathematics as the years went on.

The explanation lies in the connection due to teaching, that in most schools becomes stronger as the child goes up the school. The three

Z_1


A. Theoretical Curve $\bar{\alpha}_t = \cdot 096$.
B. Best Fitting Curve $\bar{\alpha}_t = \cdot 116$.
C. Observed tetrads.
29
22·8
A
C.
B
- ·32
-·24
-·16
-·08
0
·08
·16
·24
·32

Z_2


31
30
A Theoretical curve $\bar{\alpha}_t = \cdot 092$
B Best fitting curve $\bar{\alpha}_t = \cdot 120$
C. Observed tetrads
25
C
20·5
20
15
B
A
10
5
-·32
-·24
-·16
-·08
0
·08
·16
·24
·32

subjects are bound together more firmly by constant application of algebraical methods to arithmetic or geometry, or of geometric illustrations and proofs to algebra or arithmetic.

So the correlations between the three abilities should be greater in the higher forms than in the lower, if this was the only factor at work.

In Table I we see there is no evidence that this is the only factor at work. These correlations are not always greater in the upper forms than in the lower forms.

Here we see the danger of generalizing from a few maybe rather spectacular special cases.

The factors determining correlations between mathematical abilities are varied and the bond due to general connection through teaching is an important though not the only one. These factors have been discussed at some length in this *Journal*, Vol. vii (see pp. 275-282).

VII.—AN INVESTIGATION OF TETRAD DIFFERENCES.

Professor Spearman's criterion of tetrad differences is taken as a means of determining the presence or otherwise of a group factor in mathematics.

For this purpose two forms, consisting of thirty-one girls and thirty girls respectively of a secondary school, were taken.

Two tests were given in each of the three subjects, arithmetic, algebra and geometry.

a_1a_2 represents the two tests in arithmetic.

b_1b_2 represents the two tests in algebra.

c_1c_2 represents the two tests in geometry.

The tests a_1a_2 and b_1b_2 and c_1c_2 were set so as to be as little overlapping as possible; a sample of the tetrad differences is:

$${}^{r}a_2c_1\ \ {}^{r}b_1b_2 \sim {}^{r}a_2b_2\ \ {}^{r}b_1c_1.$$

The number of tetrads$=2\times 6c_4\times 3=90$ (i.e., 45 positive, 45 negative).

Forms tested: Z_1 and Z_2.

	Z_1	Z_2
Mean of the tetrads	$=\cdot 073$	$\cdot 072$
Mean of their probable errors ..	$=\cdot 079$	$\cdot 081$

The best fitting curve (Type 11a—Pearson Curve) was drawn to the observed distribution of tetrads.

Analysis of the tetrad curves.

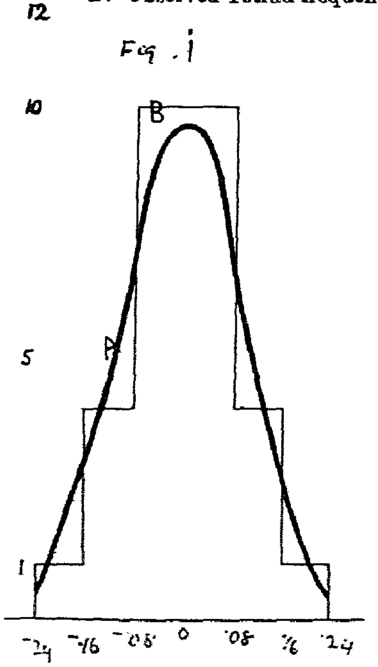
Considering the comparatively few tetrads the similarity between the two curves, although not perfect is too close to suggest a large group factor. The fact that the means of the tetrads for Z_1 and Z_2 are ·073 and ·072 and for the probable errors ·079 and ·081 respectively suggests, too, only a small overlap.

ARITHMETIC AND ALGEBRA.

A. Probability Curve of the form $y = \frac{N}{\sigma\sqrt{2\pi}} e \frac{-\alpha 2}{2\sigma 2}$

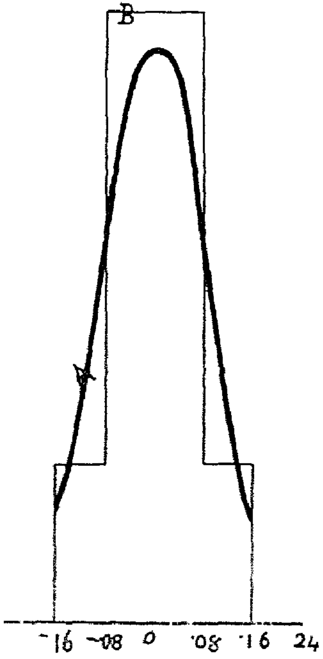
B. Observed Tetrad frequencies

Fig. I



ARITHMETIC AND GEOMETRY.

Fig: II



ALGEBRA AND GEOMETRY.

Fig: III

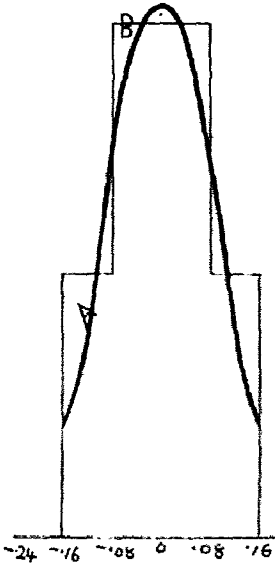
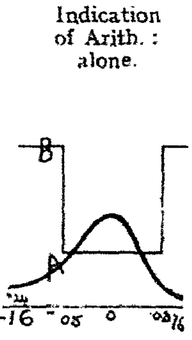


Fig: IV



Whilst these agreements are not perfect, considering the small number of tetrads, there is too much resemblance between the behaviour of the observed frequencies of the tetrads, and the theoretical curves for non-overlapping tests, to lead us to suppose the presence of a large group factor in the abilities of arithmetic, algebra and geometry. This conclusion seems to be borne out by the analysis of the correlations, the children's introspections and the observations collected from teachers of mathematics.

The next consideration was the behaviour of the tetrads when the abilities of arithmetic, algebra and geometry were taken in pairs.

For this purpose Z_1 was the form chosen for more tests.

Two algebra, two geometry and four arithmetic tests were finally correlated.

(1) Tetrads involving only arithmetic and algebra :

Number of tetrads .. .. .. = 30
Mean of the tetrads .. .. .. = ·064
Mean of their probable errors .. .. = ·062

The probability curve is seen to agree very well with the observed frequencies. Although the number of tetrads is only very small their frequencies indicate very clearly the absence of any large overlap in these two abilities.

(2) Tetrads involving only arithmetic and geometry.

Number of tetrads .. .. .. = 30
Mean of tetrads .. .. = ·054
Mean of their probable errors .. .. = ·065

Whilst there is not quite such a close agreement between the probability curve and the observed frequencies as in (1) the agreement is very fair and the same lack of any large overlap seems to be apparent.

(3) Tetrads involving only algebra and geometry.

Number of tetrads .. .. .. = 30
Mean of tetrads .. .. = ·078
Mean of their probable errors .. .. = ·064

For the ^{r}ab, ^{r}ac, and ^{r}bc tetrads the probability curve agrees too well with that for the observed frequencies for a large group factor to be indicated.

Any overlap that occurs then between any of the abilities taken in pairs, according to the curves, seems to be very small (Fig. I, II and III).

In Fig. I, II and III the number of tetrads is only thirty, but the consideration of their mean, and of the p.e., gives us help in this question of overlap.

In Fig. IV the difference between the probable error and observed frequencies is very marked.

The mean of the tetrads is ·100, whilst the mean of their probable errors is ·055. Here all the tetrads were formed of correlations between different tests in arithmetic only, so of course we should expect an overlap as Collar, Dr. William Brown and others have found.

These arithmetic tetrads were worked out to show the difference between their behaviour and those of 1, 2 and 3.

I realize that the number of tetrads considered was small. Practical difficulties of testing the same class a great many times prevented a larger number of tests being given.

Yet we get from ninety tetrads some indication of whether from their behaviour we may expect a group factor or not.

Certainly the indication is very clearly on the side of no very large group factor.

The next consideration was to investigate the possibility of the three branches of school mathematics being specific abilities.

In Professor Spearman's *Abilities of Man* he says : " Cases of specific correlations or group factors have been astonishingly rare."

He quotes the arithmetical ability as one of them and the geometrical, when it involves the eduction of correlates, as another.

Collar found a group factor throughout his divisions of arithmetical abilities.

His tetrad :

	$Arithmetic_a$	g_a
$Arithmetic_b$	·739	·390
g_b	·390	·577

giving the tetrad difference ·273 with a p.e. of ·055. The work of Rogers gave a very similar result. His tetrad difference was ·254 with a p.e. of ·023. Dr. W. Brown found no group factor in his four geometrical abilities referred to previously, although he describes a group factor in arithmetical abilities.

I wished to discover whether or not there were a group factor extending throughout the work done in geometry in schools. I sought for an answer to the question : Is it scientifically correct to say that a child is good at geometry ? Or must one say the child is good at certain abilities that seem to be parts of the ability in geometry ?

The same question can be asked of algebra. The same has been asked of arithmetic, and answered by several people.

Tests were used for this purpose from Z_1 and Z_2 (fifty girls) parallel forms of a secondary school. Reference abilities were obtained after the manner described by Professor Spearman.

The reference abilities taken were a test of opposites (g_1) and a test of classification (g_2).

The following tetrad

	Geometry$_2$	g_2
Geometry$_1$	·87	·32
g_1	·27	·35

gave a tetrad difference of ·2181 with a p.e. of ·047. We see the tetrad difference ·2181 is 4·6 times its p.e. Thus a group factor is indicated here.

The same forms were used for tests in algebra and arithmetic with the following results.

The algebra tests gave the following:

	Algebra$_2$	g_2
Algebra$_1$	·58	·13
g_1	·22	·35

giving a tetrad difference of ·1744 with a p.e. of ·042. Here the tetrad difference of ·1744 is over four times its p.e.

The arithmetic tests gave:

	Arithmetic$_2$	g_2
Arithmetic$_1$	·85	·32
g_1	·14	·35

giving a tetrad difference of ·2527 with a p.e. of ·046. This tetrad difference is 5½ times its p.e. Collar's result is similar.

So from this investigation of school mathematics there seems to be a group factor in geometry, another one in algebra, and still a third in arithmetic.

These apparent "group factors" may be called the specific factors or the *S* factors of Spearman. From the considerations of the tetrad differences previously discussed, these specific factors in arithmetic, algebra and geometry seem to be only slightly overlapping.

VIII.—SUMMARY.

1.—The considered opinions of teachers of mathematics from different schools and localities are almost unanimously in favour of the view that geometry involves a different ability from that required by either arithmetic or algebra. A less clearly defined opinion considers arithmetic as requiring different ability from that involved in algebra. The teachers gave the reasons for such differences as functions of adventitious influences and not as belonging to innate tendencies.

2.—As a result of a statistical analysis of the correlations obtained from the test marks the following observations have been made:

(*a*) There is no indication of any large group factor in arithmetic, algebra and geometry taken in pairs.

(*b*) There is no indication of any large group factor running through the three abilities of arithmetic, algebra and geometry. The best fitting curve for the tetrads and the theoretical curve to be expected for no overlap approached each other too well to admit of anything but a very small group factor.

(*c*) There is an indication of the specific nature of each of the three abilities as shown by significant tetrad differences.

In some of the larger correlation coefficients there is evidence of a group factor between arithmetic, algebra and geometry taken in pairs.

Where they occur the overlapping factors between algebra and geometry do not appear to be connate and intrinsic to the activities but are functions of extraneous influences, such as teaching methods.

These extraneous influences are very pronounced and may cause a considerable overlap.

The group factor where present between arithmetic and geometry seems to be due to the application of number to geometry.

This use of number in geometry cannot be said to be intrinsic to the activities of spatial conception. It is, however, the very essence of arithmetic.

A group factor when found between arithmetic and algebra may seem to be due to influences which are intrinsic to the activities involved in both. Both involve such activities as figure sense and accuracy in computation.

The research, however, has not revealed a large group factor of this nature. Where the group factor is considerable it appears to be a function of extraneous influences.

3.—The correlations of the three subjects with intelligence were low. This seems explicable partly because of extraneous influences, partly because of the specific quality of each subject.

4.—Conversations with the children revealed some of the reasons for the apparent peculiarities of the correlations. There was lack of interest and antipathy on the one hand, interest and enthusiasm on the other. These different attitudes did not always indicate difference in ability, but difference in the directing of mental energy. Differences in early teaching and early attitudes contributed to the fictitious differences in mathematical ability during several if not the whole of the school years.

5.—Arithmetic, algebra and geometry seem to have no large enough group factor to justify their being placed in one class for purposes of examination.

RÉSUMÉ.

UNE ETUDE PSYCHOLOGIQUE DE L'APTITUDE POUR LES MATHÉMATIQUES.

LE PROBLÈME.—Une enquête sur l'enseignement des mathématiques dans les lycées, surtout dans le but de découvrir, par une méthode scientifique, si ou non, il est légitime de comprendre l'arithmétique l'algèbre et la géométrie dans un seul groupe pour l'examen du " school certificate and matriculation ". (Examens que passent les élèves au bout de quatre ou cinq années d'études secondaires).

Si l'Arithmétique, l'Algèbre et la Géométrie exigent des aptitudes séparées et distinctes, alors l'on devrait les considérer comme des branches séparées dans les examens scolaires.

LA MÉTHODE DE L'ENQUÊTE.—On envoya aux professeurs de mathématiques dans différentes régions de l'Angleterre un questionnaire pour s'informer de leurs opinions quant à ces variations dans l'aptitude pour les mathématiques. On fit alors une enquête statistique en appliquant à des élèves dans quatorze lycées des tests d'Arithmétique, d'Algèbre, de Géométrie et d'Intelligence.

L'on examina, en tout, quatre cent dix élèves. On compara les résultats et en calcula les corrélations partielles. L'on appliqua le critère de la différence " tetrad " du Professeur Spearman. On causa avec les élèves examinés et se rendit compte de leur attitude subjective envers les tests et envers les mathématiques en général.

LES RÉSULTATS.—Il ne sembla en ressortir aucun facteur général assez considérable pour légitimer le groupement de l'Arithmétique, l'Algèbre et la Géométrie dans les examens scolaires. Dans quelques classes des facteurs généraux assez importants se révélèrent, mais ceux-ci semblaient procéder d'influences étrangères et n'être ni essentiels ni intrinsèques aux activités exigées par les aptitudes en question.

ZUSAMMENFASSUNG.

EINE PSYCHOLOGISCHE UNTERSUCHUNG DER MATHEMATISCHEN BEGABUNG.

DAS PROBLEM.—Eine Untersuchung über die Mathematik in der Schule, durchgeführt hauptsächlich in der Absicht, durch wissenschaftliche Methoden herauszufinden, ob es berechtigt ist oder nicht, Rechnen, Algebra und Geometrie als eine Gruppe für School Certificate und Matriculation Examinations (Prüfungen, die am Ende 4 oder 5 jährigen Unterrichts an einer englischen höheren Schule abgelegt werden) zu behandeln.

Wenn die Begabungen für Rechnen, Algebra und Geometrie verschiedene und deutlich von einander abgegrenzte Fähigkeiten sind, dann sollte man sie auch bei Schulprüfungen dementsprechend behandeln.

DIE UNTERSUCHUNGSMETHODE.—An Mathematiklehrer in verschienen Teilen Englands wurde ein Fragebogen geschickt, um ihre Meinung in Bezug auf diese Unterschiede in der mathematischen Begabung festzustellen. Dann führte man noch eine statistische Untersuchung durch. Kindern von 14 Schulen wurden Tests in Rechnen, Algebra, Geometrie und allgemeiner Begabung gegeben.

Im ganzen wurden 410 Kinder getestet. Die Ergebnisse wurden verglichen und Teilkorrelationen ausgewertet. Prof. Spearmans Kriterium der Tetradifferenz wurde angewendet. Aus Gesprächen mit den geprüften Kindern ermittelte man ihr persönliches Verhalten zu den Tests und zur Mathematik im allgemeinen.

ERGEBNISSE.—Es ergab sich anscheinend kein genügend grosser Gruppenfaktor, der bei Schulprüfungen die Zusammenziehung von Rechnen, Algebra und Geometrie zu einer Gruppe rechtfertigen würde.

In einigen Versuchsreihen traten ziemlich grosse Gruppenfaktoren auf, aber sie schienen ihre Ursachen in äusseren Einflüssen zu haben und nicht aus den geistigen Vorgängen zu stammen, die bei den betreffenden Fähigkeiten ablaufen.

A COMPARISON OF TESTS OF ARTISTIC APPRECIATION.[1]

BY HEATHER DEWAR

(From the Psychological Laboratory, University College, London).

I.—*General plan of the research.*
II.—*Correlations between persons.*
III.—*Correlations between tests.*
IV.—*Independent evidence as to the nature of the processes tested.*
V.—*Summary and conclusions.*

I.—GENERAL PLAN OF THE RESEARCH.

Problem.—The need for some practicable test of artistic capacity has long been felt. Education authorities maintain schools of art and art classes; but the entrance examination, when there is one, includes nothing that could be accepted as a valid test of latent æsthetic talent. Hence, it is not surprising to find the teachers continually complaining that pupils may spend a year or more over their training, only to demonstrate at the end of it that they were quite unfitted for this particular work. The vocational psychologist is confronted with much the same requirements when he desires to estimate suitability for an artistic career. Even manufacturers have recently been led to deplore the paucity of persons possessing a gift for designing or for some other form of applied art calling for some measure of æsthetic taste; and it has more than once been suggested that the British nation is peculiarly lacking in artistic talent. "No psychologist," however, "could agree that a national taste which was flourishing in the seventeenth and eighteenth centuries could have been stamped out in the nineteenth: the capacity must still be there: only there is no effective method for discovering it."[2]

In this country valuable work has been done on æsthetic perception by Dr. Bullough at Cambridge and on the æsthetic preferences of children by Professor Valentine at Birmingham:[1] but so far practically the only work with actual tests of artistic appreciation and performance among children would seem to be that carried out by Professor Burt and those who have worked with him as co-operators or assistants—Miss Bulley, Miss Pelling, and Dr. Stephenson.[2] Hitherto, however, no systematic comparison has been made of the different types of test used in this country or abroad. It was primarily with this problem that my own investigation was concerned. I am indebted to Professor Burt for suggesting the questions to be attacked and the experimental and statistical methods to be adopted.

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[1] A paper read before the British Psychological Society, March 13th, 1937.

[2] BURT, C.: 'The Psychology of Art' (*How the Mind Works*, pp. 294, *et seq.*). Compare the comments on the 'haphazard methods of recruitment of young designers into industry' contained in the Report of the Council for Art and Industry on *Design and the Designer in Industry* (1937, esp. para. 28). It appears that the lack is most severely felt in the dress and allied industries; and the lack is not so much of the technical skill to draw, but of the æsthetic taste required in decoration and design and in distinguishing good design or decoration from what is cheap or worthless.

Subjects and tests.—My research was started in October, 1934, and is still in progress. What follows, therefore, is a preliminary account of results so far obtained. The main part of my experiments was carried out at four girls' schools.[3]

In all, 338 children were tested, namely, 65 girls aged 11-13 at an elementary school, 200 girls aged 11-16 at two central schools, and 73 girls aged 11-16 at a private secondary school. In addition, a number of adults, including a small group of expert artists and art critics, were good enough to submit themselves to some of the newer tests, and to offer criticisms and suggestions in regard to their construction and choice.

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[1] VALENTINE's suggestive little volume on *The Experimental Psychology of Beauty* (1919) summarizes the more important contributions on the experimental study of artistic appreciation. He was able to report hardly any work in this country on the direct measurement of children's capacity for artistic appreciation, as distinct from their capacity for artistic execution or creation. Miss NEWCOMB's later article on 'A Tentative Scale for Measuring the Growth of the Appreciation of Beauty in School Children,' which has since appeared in the *Forum of Education*, 1924, II, is a noteworthy exception, but deals with earlier stages than I have in mind here (I am indebted to Professor Valentine himself for the reference). In his own volume he makes the very pregnant suggestion that the type of æsthetic appreciation, not only for pictorial art, but also for poetry and music, might be taken as indicating the level of æsthetic development achieved by the individual (*loc. cit.*, pp. 86-87, 101).

[2] With the assistance of Miss Pelling, of the National Institute of Industrial Psychology, he had previously devised an individual test of artistic appreciation and used it, apparently with success, in some of the London County Council Schools of Art. In collaboration with Miss Margaret Bulley (who also assisted in providing standards for the picture postcard test) he has carried out a more extensive series of tests concerned rather with applied art—furniture, dress materials, vases, china, and the like. A brief preliminary account of the former will be found in the chapter just cited (*loc. cit.*, pp. 280-92). I have also had access to an unpublished report of the work for the National Institute, giving, in fuller detail test methods, statistical analyses, and provisional age norms. The experiments with the test of applied art are described by BURT and BULLEY, *The Listener*, IX (1933, 8th January, 8th February, 27th December), and by BULLEY in this journal (IV, 1934, pp. 162-182, 'An Inquiry into Æsthetic Judgments of Children'). Miss Bulley's instructive little book, *Have You Good Taste?* gives the pictures used (with some additions) and an appendix by Burt with a further analysis of the results. For the measurement of the artistic abilities of London children by drawing tests, see his *Mental and Scholastic Tests* (pp. 317-327, 383-394).

[3] I must express my gratitude both to the head mistresses for permitting me to work in their schools and to the art mistresses for furnishing independent estimates of the children's artistic capacities for comparison with the test results.

Four tests were ultimately adopted: first, the well-known test of art judgment devised by Meier and Seashore[1]; secondly, the test devised by McAdory,[2] testing appreciation of form, of colour, and of notan (i.e., light and shade and general distribution of tone and mass) respectively; thirdly, an extended form of the tests of appreciation for applied art used by Bulley and Burt in their broadcast experiments[3]; and, finally, a modified form of Burt's picture postcard test.[4] Owing to the exigencies of the school time-table, it was not possible to carry out the complete programme with all the children: hence for some of the statistical comparisons, as the probable error will show, rather smaller groups were used. The preliminary results obtained with these tests have led me to construct a series of original tests which seem likely to give still better results, and which I hope to describe later in detail. Here, therefore, I need give no further account of the actual tests themselves: their general nature can be sufficiently gathered from descriptions already published.

II.—CORRELATIONS BETWEEN PERSONS.

Methods of analysis.—There are various methods available for analysing the test-performances in order to ascertain what mental capacities or processes are apparently elicited by the tests. I shall deal first and most fully with the statistical results; and, to save space, shall report only the more suggestive calculations.

With such data as the present, where subjective judgments are concerned, Burt has already pointed out that much information may be gained, not only by correlating tests, but also by correlating persons. More particularly, in experiments on artistic appreciation, he suggests that the correlations of the individual tested with the performances of an ideal person taken as a standard may provide a convenient measurement of that individual's capacities, and, further, that a detailed factor-analysis of the correlations between persons may yield more exact criteria for the determination of æsthetic types.[5]

[1] MEIER, N. C., and SEASHORE, C. E.: *The Meier Seashore Art Judgment Test*, 1930.

[2] MCADORY, M.: *The McAdory Art Test*, 1929.

MCADORY, M., and WOODYARD, E.: *The Validity and Standardization of the McAdory Art Test*, 1933.

[3] BULLEY, M. H.: *Have You Good Taste?* 1933.

[4] *Loc. cit. sup.*, p. 289.

[5] *How the Mind Works* (1933), pp. 279-293. Cf. *Brit. Journ. Psych.*, XXVIII, i, pp. 63, *et seq.*

Ordinarily, the nature of the 'factors' entering into a set of tests is examined by factorizing the correlations between the tests themselves. It may be proved, however, that, under appropriate conditions, the correlations between the persons lead to practically the same factors; and, in the exceptional cases in which the persons are few in number, this appears to provide the more convenient approach. The data obtained from adults I shall therefore deal with by this procedure; the data obtained from children will be analyzed in the older and more familiar way. In either case it is desirable to check the conclusions suggested by statistical analysis by independent evidence gathered by other means, more particularly by introspection.

The general factor of artistic appreciation.—If we are to seek a single test-measurement for 'artistic appreciation,' whatever that may be, it is important first of all to inquire whether any single central factor exists which mainly determines the artistic judgments of different persons. To prove that this factor is the sole factor, or even a simple factor, is, of course, by no means necessary. It may be, and, indeed, it almost certainly is a complex resultant. There may be, too, and almost certainly are, many other specific factors, each of them perhaps influencing certain persons or certain groups. The chief questions, therefore, are: do these irrelevant factors have sufficient weight to obscure and overlay any general or universal tendency that may operate, and do the standards and criteria differ so completely from one competent judge to another that no single test is conceivable?

To examine these issues the plan followed was that originally devised by Burt and Pelling in their investigation at the National Institute of Industrial Psychology. As regards method, their tests, being designed for the vocational psychologist rather than for the teacher, were given in 'individual' form as distinct from 'group' form. As regards material, they found that the test showing the highest 'reliability' and the greatest 'validity' was a 'mixed' or 'omnibus' test: this consisted of a series of fifty pictures in postcard form, dealing with a wide variety of subjects. Experiments were also made with 'homogeneous' test-material —short series each dealing with similar subjects (e.g., all representing buildings, for those intending to specialize in architecture, or all representing dresses and dress-materials, for those specializing in dress designing, or specimens of colour-combinations to test a sense of colour-harmony): but these furnished far lower correlations, and were neither so suitable for children nor so thoroughly standardized.

Their general procedure was to get the examinees to arrange the material in order of preference and then correlate, not the test-items, but the persons

—a method already used by them for other industrial tests. Judged by the criteria for a general factor, their correlations suggested that the main determinant was a single general factor operative throughout, though group-factors indicating specific types (analogous to those observed by Bullough with a different procedure) were also discernible. Since, however, similar experiments[1] recently carried out in the same laboratory seemed at first sight to contradict these conclusions, it appeared desirable to examine the question afresh.

Unfortunately, only one set of the picture postcards originally used existed; and on trying to obtain duplicate series it was found that the worst specimens were already out of print. Hence it seemed desirable to change the collection to some extent, so as to ensure that, so far as possible, all the cards might be easily procurable. The original series was intended to represent a random sample of the total ' population ' of such cards, with degrees of merit distributed approximately according to the normal curve. This meant a large number of mediocre cards, whose different values were all but indistinguishable. For the present series it was suggested that a rectilinear distribution of merit might be more effective: this meant choosing the cards so that (as far as possible) the interval between each card and the next highest in artistic value should be approximately the same throughout the series. An incidental advantage of this plan was that, in correlating persons, a simple correlation by ranks could be substituted for the more elaborate product-moment formula.

TABLE I.

CORRELATIONS BETWEEN PERSONS.

(NINE PROFESSIONAL ARTISTS AND ART CRITICS: SEVENTY PICTURE POSTCARDS RANKED IN ORDER OF ARTISTIC MERIT.)

Persons.	*A.*	*B.*	*C.*	*D.*	*E.*	*F.*	*G.*	*H.*	*I.*
A.	—								
B.	·750	—							
C.	·729	·758	—						
D.	·680	·729	·650	—					
E.	·691	·725	·670	·704	—				
F.	·715	·654	·733	·772	·786	—			
G.	·703	·710	·697	·734	·684	·566	—		
H.	·747	·650	·736	·707	·651	·754	·625	—	
I.	·707	·738	·730	·642	·682	·577	·782	·568	—

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[1] STEPHENSON, W.: *Character and Personality*, IV, 1, p. 22.

In my preliminary experiments seventy picture postcards were employed, and nine art experts (amongst others) were asked to rank them.[1] Several of the judges were sceptical about the feasibility of the experiment: the artist of the older school declared that the modernist would entirely reverse his order, and both were sure that any approach to an agreement was out of the question. The degree of resemblance between their various rankings is shown in Table I.

The matrix of correlations has been subjected to a factor-analysis according to the methods described by Burt for factorizing correlations between persons.[2] Four formulæ have been used: first, Spearman's original formula for determining 'saturation coefficients'; secondly, Burt's summation method'; and, thirdly, his least squares formula, with the reliability coefficient[3] taken to measure the correlation of each test with itself; and, lastly, the least squares formula, with the self-correlation estimated by successive approximation. Burt's summation formula is identical with that recently termed by Thurstone the 'centre of gravity' formula, except that the self-correlations (r_{jj}) are determined by successive approximation, instead of by the highest coefficient in the row. The least squares formula, with reliability coefficients used for self-correlations and put equal to unity, gives results identical with the methods of Hotelling and Kelley.[4] Spearman's formula was used by Stephenson:[5] it enables the saturation coefficients to be calculated from a matrix from which the self-correlations are omitted.

The saturation coefficients obtained in these various ways for the first or 'general' factor are shown in Table II. The method of least squares gives the closest fit. Owing to the strong hierarchical tendencies shown by the table, the results of the four different methods are in close agreement. Naturally (iv)—the 'least squares' formula with self-correlations put equal to unity (the Hotelling-Kelley procedure)—diverges somewhat from the other methods, where the self-correlations are virtually identified with the 'communality' coefficients: higher values are necessary to account for the

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[1] I have to express my indebtedness to a number of persons who have been good enough to undertake the arduous task of ranking the pictures in order of merit, more particularly to Miss Margaret Bulley (author of well-known works on art, and herself an investigator of children's artistic judgments), Miss Marion Richardson and Mr. Tomlinson (Art Inspectors for the London County Council), Mr. A. B. Allen (author of *Art and Artistic Handicrafts for the School*), Dr. P. B. Ballard (who, besides being an expert educational psychologist, is himself a painter of recognized merit), and several members of the Slade School of Art.

[2] *Marks of Examiners*, pp. 275, *et seq.*

[3] It was impossible to expect all the art critics to undertake the test twice. Several other persons did so, however, and the reliabilities were found to range from ·9 for the less experienced to unity for the most experienced. The latter, indeed, even after a long interval, seemed either to remember their original judgments so perfectly, or else to apply their same definite criteria so consistently, that the few alterations were rarely sufficient to reduce the coefficient below 1·00.

[4] The iterative procedure is by no means so laborious as Hotelling's description suggests. The differences between the successive product-sums approximate to a geometrical progression. Hence the final value can be readily estimated by extra- and intra-polation.

[5] *Loc. cit.*, p. 21.

TABLE II.

SATURATION COEFFICIENTS FOR FIRST AND SECOND FACTORS CALCULATED FROM CORRELATIONS BETWEEN PERSONS.

Persons.	*A.*	*B.*	*C.*	*D.*	*E.*	*F.*	*G.*	*H.*	*I.*
FIRST FACTOR— *Method* :									
i. Summation (r_{jj} omitted)..........	·859	·859	·855	·841	·837	·830	·821	·810	·808
ii. Summation (r_{jj} by successive approximation)	·856	·854	·850	·844	·840	·836	·820	·815	·798
iii. Least Squares (r_{jj} by successive approximation)	·860	·859	·857	·843	·839	·833	·824	·814	·812
iv. Least Squares (r_{jj}=1·00)..........	·874	·873	·871	·859	·856	·852	·844	·836	·834
SECOND FACTOR— Summation (r_{jj} by successive approximation)	·033	·142	·086	—·147	—·117	—·353	·203	—·182	·350

higher self-correlations. The alternative 'least squares' method (iii) and the more rapid 'summation' method (ii) here differ very little from each other or from the somewhat longer formula of Spearman (i). The figures thus provide an interesting confirmation of the fact that, for a table like the present, all the various methods are simply alternative methods of approximation to the same theoretical coefficients.

For our present purpose, the important results are these. First, all the correlations, and therefore all the saturation coefficients for the first factor, are positive. Contrasted correlations, positive and negative, suggestive of the contrasted tendencies or types, only appear after the general factor has been eliminated by partial correlation. Since the number of correlated items is 70, the probable errors are low and range from ±·03 to ±·05. The saturation coefficients are high. There seems, therefore, to be ample ground for assuming a central or general factor determining the various orders given. On squaring and summing the saturation coefficients we find that the general factor here accounts for over 70 per cent of the total variance.

On deducting the effects of the first or most general factor, the differences between the theoretical values and the observed rarely equal twice the probable errors of those differences, and never equal three times the probable errors. The residual correlations, therefore, though perhaps in a few cases suggestive, are scarcely 'significant' in the full conventional sense. They point to, though they do not prove, the existence of a second factor. For this the saturation coefficients, calculated by the simpler least squares formula, are given in the last line of Table II. The factor is now bipolar, and suggestive of antithetical types similar to those described by Burt ('objective' or 'classical,' 'subjective' or 'romantic,' etc.). Of the five judges who have positive saturations for this factor, three have an avowed preference for what one of them terms 'pre-post-impressionist art.' Of the four who have negative saturations, three show opposite leanings. The contrast becomes manifest when we examine the details of the rankings: very significant discrepancies arise over the work of such artists as Cézanne, van Gogh, and Marc, on the one hand, and Greuze, Holman Hunt, Rossetti, Dicksee, on the other. Thus, from the arrangement of the cards, it seems possible to infer, not merely what general degree of taste the individual has, but also in what direction his preferences tend. Two ideal orders can be deduced, the first depending solely on the first factor, the second solely on the second: and then the correlations of any fresh individual's ranking with these two orders respectively will measure his general powers of artistic appreciation and his specific leanings towards this type of art or that.

The only evidence based on factor analysis that might appear at first sight to conflict with my main conclusion is that recently published by Dr. Stephenson as a result of experiments in the same laboratory.[1] He originally experimented with some of the test-material I had used (essentially the same as that used by Burt and Bulley, but prepared for children); but subsequently decided to discard it as " unsuitable for bringing out differences in type among adults," and to use colours and postcards of his own. No doubt this change to more homogeneous material[2] may partly explain the apparent difference in result. Following Burt's procedure he worked out correlations between the persons tested, but found two factors instead of one, the first making for good artistic taste and the second for the opposite. He reports what he terms a 'system 5'[3]: persons A to F tend to correlate positively, and persons G to O tend to correlate positively, but A to F correlate negatively with G to O. Such a pattern, called by Burt a 'bipolar pattern,' arises when the general factor is explicitly eliminated or implicitly ignored (e.g., by treating the means of all persons as equal, as the method of correlating persons necessarily entails: cf. tables of specific correlations, *Annual Report, Brit. Assoc.*, 1915, pp. 694-6). On referring to Dr. Stephenson's table, however, it will be seen that, out of the fifty-four coefficients which should be negative according to this system, all except seventeen are positive, and the highest negative coefficient is not three times its probable error. Moreover, instead of his two factors being independent, their saturation coefficients stand in high correlation: indeed, he himself describes his second factor as " the obverse of the first." Since the saturations are correlated, we may perform a factor analysis on them, and this at once shows the predominance of a single factor common to both, which may be identified with the general factor that can be readily derived from the observed values. Hence it would seem there is no real inconsistency between his results and my own. We both agree in finding large factors only for artistic taste in general. Although his main object was to investigate artistic types he found apparently no signs of 'types' in Bullough's sense.[4]

[1] *Character and Personality*, IV, i, pp. 20 f.; *Brit. J. Psychol.*, XXVI, iv, pp. 353 f.

[2] He ultimately decided to use vases—the most typical of the Bulley series of objects of applied art. As noted above, Burt, Pelling, Bulley and Gordon all found lower correlations with homogeneous as distinct from a mixed or omnibus test. I should add that I am specially indebted to Dr. Stephenson for the trouble he has been good enough to take in sending fuller explanations of his methods and results for the purposes of this report.

[3] *Brit. Journ. Psych.*, XXVI, pp. 349, 353.

[4] In discussing the postcard test, he refers to the possibility of an additional factor (*loc. cit.*, p. 353); but evidently the residuals on which it would have been based were too small for its saturation coefficients to be worth calculating. From recent correspondence I gather he would accept this conclusion and account for the slight differences by the difference in test material. He writes: " My own data was obtained with more homogeneous material. I selected my postcards so that opposite types might appear. My choice of cards was intended to bring these out more clearly, if possible."

Although his correlations are lower than my own, my own in turn are slightly lower than those previously obtained by Miss Pelling and Dr. Burt. My own average ·698 and theirs ·897. Probably much the same explanation applies. As remarked above, my postcards had none that were quite so bad as the worst specimens in their collection. Thus my test material was perhaps a little more homogeneous than theirs, just as Dr. Stephenson's was a little more homogeneous than mine.

I should like to express my appreciation of the kindly interest shown by Dr. Stephenson in my work and the helpful criticisms he has made.

It would be possible to show that the conclusion so strikingly revealed in this first group is also borne out by the results of correlations with other and bigger groups: but it is hardly practicable to print in full correlations between large numbers of persons. When the correlations are obtained from persons who are not highly competent art critics, " the influence of irrelevant factors " (as Burt also found) " becomes more obvious." How irrelevant the factors appear must depend largely on our views of art. As he observes: " Many art critics—Ruskin, for example—would maintain that a true artistic sense must appreciate nobility of subject as well as nobility of form or style: for them subject is not irrelevant to art. If, however, we are interested solely in the sense of artistic form, then differences in subject may introduce spurious correlations; for, in general, the more dignified painters choose the more dignified subjects, and, unless (as in the series of cards selected) we deliberately introduce specimens in which noble subjects are ignobly treated, the examinees might approximate pretty closely to the art-critics' order by ranking the cards, not for the artistic treatment, but for the subject treated. It is noticeable that, with homogeneous material as distinct from mixed—i.e., when the subjects are the same throughout, or when there is no concrete subject at all (as in the tests of applied art)—the correlations are very much lower among children and also among experts. The recent work of Miss Gordon seems to bear this out."[1]

With correlations obtained from a random sample of ordinary adults, the general factor is not precisely identical with that obtained from experts. With the former, when the general factor is eliminated, a bipolar factor (or set of factors) appears which seems to indicate how far the judgment of the untrained person is or is not affected by what may be broadly termed subjective associations. Thus within the larger groups at least two sub-groups or ' types ' can be distinguished:[2] first, persons belonging to what Bullough has called the 'objective' type—persons who base their judgments definitely on the thing actually shown, adopting a critical attitude and generally evincing a preference for pictures of a 'classical' style; secondly, persons belonging to what might by contrast be called the 'subjective' type (including Bullough's 'associative,' 'physiological,' and 'character' types)—persons who base their judgments more upon the effects of the object on themselves, that is to say, upon the emotions and associations it arouses, upon the sentimental feelings it suggests, upon the pleasant memories it brings back to mind, or upon the kind of character or personality it seems to convey; such persons generally show a preference for pictures of the 'romantic' schools, and like a technique that does not call attention to its own efficiency or novelty, but is realistic enough to allow the mind to take it, as it were, for granted. The degree to which an individual approximates to a given type can be measured by the saturation coefficient for the 'factor' which produces the type. Burt found, not only that children tend more towards the latter (the 'subjective' or 'associative') type, but also that the younger the child the higher his saturation coefficient for this specific factor. With the youngest of all, the story that the picture presents, the subject or the scene that it portrays, may dominate entirely over interest in the mode of presentation. Nevertheless, even among the youngest tested a genuine æsthetic appreciation and even a sympathetic admiration for technical ingenuity or skill may at times be found; and at every age the average correlation with the 'general factor' as given by the experts' order is still positive.

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[1] Miss Gordon's ' Study of Æsthetic Judgments ' (*Journ. Exp. Psych.*, 1933) was concerned with applied art. She chose fifty coloured plates of rugs, and in effect combined the two procedures of Bulley and Burt, correlating the judgments of the several persons with that of the group. She found that there was hardly a single rug which was not placed at the top and at the bottom by one or other of the judges. However, as Wynn Jones remarks, " What is surprising is the large degree of agreement found between groups of [adult] individuals who were not experts."—(*Introduction to the Theory and Practice of Psychology*, 1934, p. 158.)

[2] Cf. *loc. cit.*, pp. 287, 291. He points out that the twofold classification is analogous to that found by Binet in his work with intelligence tests (*L'Etude Experimentale de l'intelligence*, 1903) and by Burt himself in his early work on temperamental differences, where ' objective ' and ' subjective ' attitudes were distinguished (*Eugenics Review*, 1912, pp. 22, *et seq.*). The difference seems closely parallel to that subsequently named by Jung the ' extravert ' and ' introvert ' respectively. Bullough worked with simple colours and combinations of colours (*Brit. Journ. Psych.*, II, pp. 111, 406, *et seq.*, and III, pp. 406, *et seq.*).

Valentine shows that the same types reappear in judgments upon pictures (*loc. cit.*, pp. 81-83).

Group tests.—The foregoing sample of the results may, I hope, be taken as *prima facie* evidence, indicating that, with the test material described, a single general factor is mainly, though not exclusively, responsible for the judgments given. Originally, it was intended to select fifty cards out of the larger series of seventy, and, if the norms with the modified series agreed approximately with those obtained by Pelling and Burt, to use them as individual tests in the final experiment. Eventually, however, another collaborator, Miss Esmé Redmayne, agreed to take up this aspect of the problem, and I myself decided to experiment with a modified version which might enable the test to be given in group form.

For this there were several reasons. First of all, an individual test with thirty children takes thirty times as long as a group test: and, with older girls attending central and secondary schools, it proved impracticable to encroach so far upon the school time. Secondly, if the postcard test in its individual form proved superior to the tests with which it was to be compared, it would have been impossible to say whether this arose from a better choice of test-material or merely from the extra supervision the individual procedure entailed, since the others were all given in group form. Thirdly, as the wide variety of subjects aroused irrelevant interests at any rate with children, it seemed better to substitute the method of paired comparison, and to use pairs of pictures having the same subject but different artistic merit—a principle already used by Bulley and Burt in their tests. Finally, the notion of correlating persons for this and similar purposes was considered by several statisticians to be of somewhat dubious validity,[1] and in any case assumes some knowledge of the sampling distribution of the cards selected: on the other hand, the method of paired comparison was a procedure of recognized standing.[2]

Accordingly, a modified test was devised, with material mainly drawn from the seventy pictures used in the preliminary experiments. Instead of asking the examinees to arrange the cards A, B, C, . . X, Y, Z in order of merit, they were asked which they liked best: A or X, B or Y, C or Z, and so on. The relative merits were taken to be those indicated by the gradings of the nine experts. In the final form forty pairs were included; and the grading was checked by submitting them afresh to twenty adults of artistic culture.

III.—CORRELATIONS BETWEEN TESTS.

Comparison of tests of different types.—The data obtained from the large groups of children lend themselves more easily to the older method of analysis, namely, by correlating tests rather than persons. Suggestive results may undoubtedly be reached by correlating persons at different ages: it then appears (as we have already noted) that, with increasing ages and with rising levels of culture and intelligence, the type-factors and their saturation coefficients undergo a systematic change. This conclusion, as we shall see in a moment, is also brought out by the introspective data. To print and analyse tables of personal correlations would demand an undue amount of space. Here, therefore, I shall concern myself chiefly with the two points of greatest practical interest, namely, the consistency and relative value of the different tests, when compared amongst themselves.

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[1] Both Dr. Rhodes and Dr. Stephenson have criticized the applicability of correlation to such problems. Dr. Stephenson has since withdrawn his objections to the method itself, but (as noted above) still considers the present material unsuitable for correlation purposes. The statistical difficulty seems plain: may we fairly treat the test items used in our experiment as a sample population of the total population of all such test items—a sample so selected that the characteristics of its distribution can be stated or inferred with some accuracy? (The word 'population' is used in the wide sense adopted by Professor Fisher and his followers.) If so, the objections which the statisticians have advanced could presumably be answered or circumvented (see *Brit. Journ. Psych.*, XXVIII, i, p. 30). The principles adopted in trying to meet this condition have been briefly described above (p. 4). To determine this accurately would need a somewhat elaborate research. The more recent investigators who have used the 'Q-technique' seem to have overlooked this point, and evidently assume that any collection of measurements—e.g., the measurements of a single individual's body—can be treated as following a normal distribution.

[2] The method of 'paired comparison' is simply an extension of the method of 'right and wrong cases.' For the procedure see MYERS and BARTLETT, *Textbook of Experimental Psychology*, p. 306.

Reliability.—Assuming that there is a general factor which can be approximately assessed by some statistical device, the next point to determine is whether the various tests available yield results consistent with themselves, and, if so, which shows the highest consistency of all. Consistency may be measured by correlating halves of each test and applying the Spearman-Brown formula. The reliability coefficients obtained in this way are as shown below in Table III. The probable errors range from ±·01 to ±·04.

TABLE III.

RELIABILITY OF TESTS.

CALCULATED BY CORRELATING TWO SECTIONS OR TWO REPETITIONS OF THE SAME TEST.

No.	*Test.*	*Reliability Coefficient.*
1	Picture Postcards (Group Test) :	
	Private School	·93
	Central School	·79
	Elementary School	·73
2	McAdory Art Test :	
	Form	·61
	Colour	·76
	'Notan'	·60
	Total	·83
3	Meier-Seashore Art Judgment Test	·69
4	Bulley Applied Art Test :	
	One Application	·28
	Two Applications	·89

At the secondary school the picture postcard test gives the highest reliability coefficient of all. Possibly the children at the elementary and central schools were a little less efficient under the conditions of group-testing. The reliability of the Meier-Seashore test seems definitely poorer. The separate McAdory tests are, on the whole, somewhat more unreliable still ; but their pooled result gives a high figure. The low reliability of Miss Bulley's material is due to the fact that there were only eighteen pairs[1] for comparison. Here, however, it was possible to get the children to do the test twice: the reliability coefficient calculated in this way rises to a figure which is the highest in the list, except that for the picture-postcards at the private school. In theory a double application of the other tests would yield a raised reliability: in practice, however, children nearly always recognize a test on its second application, even after a long interval: and so become a little bored or careless when they find they are merely repeating an old task.

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[1] It was found necessary to omit numbers 9 and 10, since these seemed to arouse undesirable associations.

Validity.—The central problem is to determine whether the tests are not merely self-consistent, but really measure what they profess to measure. The usual procedure for establishing such a point is to secure independent assessments from some competent person who knows all the individuals. Accordingly, estimates were here obtained from the art teachers. The correlations with the tests are shown in the last line of Table IV. Almost inevitably the art teacher's assessment had to be based on the children's artistic performances rather than on their powers of artistic appreciation. The two are not quite the same. A person may be able to appreciate a beautiful picture but quite unable to produce one. This, no doubt, largely explains the difference between my own correlations and those obtained by previous investigators. Carroll compared test results with instructors' ratings for 103 art students: he found a correlation of ·40 ± ·06 for the Meier-Seashore test and ·15 ± ·08 for the McAdory test.[1] But the instructors evidently had wider opportunities for judging the true abilities of the students, and, moreover, with older and specially trained art students there seems a closer correlation between artistic appreciation and artistic execution. With children, Burt and Pelling found a correlation of ·57 between artistic appreciation as estimated by the picture postcard test and artistic execution as estimated by Burt's drawing test, while with students at art schools the corresponding correlation rose to ·77. It is, therefore, hardly surprising to find that with the children here tested even the best of the tests—the picture postcard test—correlates with the teacher's estimates only to the extent of ·33.

An alternative criterion is to inquire whether the different modes of testing the same factor correlate amongst themselves (Table IV). Judged in this way, the figures, at any rate for the picture postcard test, are, on the average, decidedly higher; next to the picture postcard test comes the McAdory test; the Meier-Seashore test is not so good; and the test based on Miss Bulley's material the poorest of all.

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[1] CARROLL, H. A.: 'What do the Meier-Seashore and the McAdory Tests Measure?'—*Journ. Educ. Research*, 1933, XXVI, pp. 26.

TABLE IV.

VALIDITY OF TESTS.

(INTER-CORRELATIONS CALCULATED BY CORRELATING THE DIFFERENT TESTS WITH EACH OTHER AND WITH INDEPENDENT ESTIMATES.)

	Picture Postcards.	*McAdory Test.*	*Meier-Seashore Test.*	*Bulley Test.*	*Art Teacher's Estimate.*
Picture Postcards	—				
McAdory Test	·51	—			
Meier-Seashore Test ..	·33	·44	—		
Bulley Test	·40	·28	·21	—	
Art Teacher's Estimate	·33	·14	·19	·05	—
Intelligence	·22	·17	·20	·15	·06

Average of all Tests:
(*a*) With Art Teacher's Estimate .... ·48
(*b*) With Intelligence (Mental Ratio) ...... ·45

A consideration of the nature of the tests themselves indicates possible sources of the defects, and suggests the lines on which an improved test should proceed. First of all, it is evidently essential to have a large number of test items. Good as it is in itself, the Bulley test is unreliable in actual practice simply because so few comparisons are actually made. Secondly, it would seem desirable to test artistic judgment in as many different forms as possible. Although in its technical construction the Meier-Seashore test looks at first sight superior, nevertheless the McAdory test proves the more effective because it requires artistic judgments on different aspects and by slightly different methods. Both these principles of test-construction are already accepted in the technique of intelligence testing; and it seems curious that in testing other capacities they have so constantly been overlooked.

Here the defects could be to some extent eliminated by combining the results of all the different tests. But, in practice, it would hardly be possible to spend so much time on re-testing a single capacity by different means. Nevertheless, the figures indicate the kind of efficiency at which a brief but more carefully constructed test might aim. If all the test results are averaged, we obtain a correlation of ·48 with the art teacher's estimate. If we allow for the fact that the teacher's estimate is itself only partly correlated with the true criterion, we obtain a corrected coefficient, indicating a possible correlation of ·64. Evidently there is plenty of room for improvement; but for a preliminary inquiry the results are certainly encouraging.

IV.—INDEPENDENT EVIDENCE AS TO THE NATURE OF THE PROCESSES TESTED.

Introspections.—To determine the real nature of the capacities elicited by the tests, and to decide on the most efficient, it is not enough to choose them as appropriately as possible on *a priori* grounds, or merely subject the quantitative results to a statistical analysis. No doubt, if tests intended to test a particular capacity such as artistic appreciation all show the influence of a single general factor, the presumption is that this is the factor which the investigator had in mind—namely, artistic capacity. Such an inference, however, needs confirming by methods more direct. Too often it has been found that a collection of tests intended to measure a specific capacity owe their correlations after all mainly to some factor that is entirely irrelevant, for example, general intelligence. More concrete evidence is consequently required.

An effort was made to get both the adults and the children to explain the actual mental procedure which they followed in carrying out the test. These introspections (if it is fair to give them such a name) are full of interesting and suggestive points. In a short preliminary paper, however, it is hardly possible to quote them in full.

Several of the children, like many of the adults, were aware of a difference of mental process in different cases. "You like one (picture) best for one reason and another best for another reason," says one girl. Such explanations were commonest in those whose judgments were relatively uncertain and most often incorrect. Among the adults, indeed, such a remark seemed frequently intended, half unconsciously perhaps, as an apology for a possible 'error.' And among both children and adults the best judges usually gave their judgments swiftly and unhesitatingly on the general effect of the two pictures taken as a whole. Thus, the majority of the genuine choices were, it would seem, immediate and intuitive. The children 'knew at once' which they liked. Frequently they summed up their judgments in a childish phrase which might be regarded as indicating a feeling for æsthetic merit: "It's lovely"; "It's beautiful"; "It looks so much nicer." Naturally they were unable to analyze out the numerous elements contributing to this total impression of æsthetic value, or, if they made such an analysis, they had no words in which to express it. (I am tempted to add that exercises such as these might usefully form an instructive and enjoyable part of the child's artistic education: it was striking to note how often the girls remarked that they would 'love to see' the originals.)

In a later paper I hope to show how the different attitudes revealed by these introspective comments also agree with the different types of appreciation indicated by the specific factor coefficients, while at the same time they seem to afford some index of artistic level. Here it may be sufficient to say that the general results tallied with those noted, more or less explicitly, by other investigators. With children on a lower level of æsthetic development (whether from lack of intelligence, of age, of cultural surroundings, or of mature artistic attitudes from whatever cause) personal associations and childish emotions formed the commonest grounds of choice.[1] 'I like that (picture) best 'cos we have it in our nursery,' or that wineglass 'because it's like the one we have ices in': such comments, as may easily be guessed, come from children of seven or thereabouts. A little later their attention becomes focussed on practical utility: 'the first chair is best because it would be so comfy to sit in.' But perhaps the earliest germs of genuine artistic criticism are to be seen in the strong demand for *clarity*. With children of the age and intelligence-level of the bulk of my examinees this seems almost universal. If a picture as a whole did not convey its intention lucidly and distinctly, it was at once disliked. Again and again in the paired comparison tests the reason given for preferring one picture to another was 'It's clearer'; and by clearness the children evidently meant quite as much what may be called psychological clearness as photographic clearness. A little later came the demand that the picture should 'look real.' As a rule, only the oldest, the most intelligent, or the most artistic (as judged by the marks obtained), referred explicitly to the specific æsthetic merits of the pictures—the skilful pencil work or the pleasing colour harmonies—or to the 'plain' or 'ornamental appearance,' the 'shape,' the 'pattern,' the 'design' of the household objects. Several of the older children reported that they 'had to think first'; and in such cases they often mentioned an appeal to would-be artistic criteria—little rules of pictorial composition that they had heard about in their art classes, opinions of adults whose views they would accept, general canons or ideals of conventional good taste: in such cases, too, their judgments were by no means so likely to be correct. Probably these external criteria played a far smaller part in their actual processes than in their descriptions of those processes: they were, so to speak, rationalizations of the half-unconscious motives for their preferences. Nevertheless, this increasingly 'objective' attitude—involving, as it does, a kind of 'psychic distancing[2]'—seems often distinctive of the more artistic child. The position of the 'character' type is more puzzling. It appears fairly common among the very youngest and commoner still among the adolescents: 'What a fat jug!' says a child of seven, 'It's laughing at you!' 'What a coy shade of blue,' says a girl of sixteen. Although expressed in more mature language, these characterizations often seem, among the adolescents, to imply a lapse to the earlier subjective and associative criteria—to the attitude that sees a man in the moon or an angry face in the pattern on the wallpaper. With simple colours, however, as with music, the tendency to read into the object presented a kind of personality, or an expression of human qualities, is frequently joined with a high level of appreciation: here, perhaps, it is a cause (or an effect) of psychic distancing,' which keeps the object independent of the practical aims or selfish interests of the spectator. But with pictures the characterizing attitude may often be noticed with very different children, of by no means a high artistic level. This reminds us that those who are classified as of one type for one kind of test-material may prove to show a wholly different attitude for other material. Here clearly is a rich field for type-analysis by more exact statistical procedures. But the introspections undoubtedly confirm what (as we have seen) was suggested by the saturation coefficients for specific factors: namely, that, with increasing age, artistic appreciation, like artistic execution (i.e., style of drawing and the like), shows "successive changes, not only in degree, but also in kind or type."[1]

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[1] BURT: *loc. cit.*, pp. 280, *et seq.* The conclusions here given are partly based on data collected by him and Miss Bulley.

VALENTINE (*loc. cit.*, p. 101) gives a table showing the degree or order of 'æsthetic value' attaching to different types of judgment and suggests that an individual's æsthetic level may be estimated by the extent to which he uses the higher or lower types of judgment.

[2] The concept of 'psychic distance' and 'psychic nearness' may best be explained by a quotation from Myers: "The sailor who climbs on to the stage to rescue the heroine is psychically too 'near' the play to appreciate its beauty. For the appreciation of beauty the (spectator's) personal and practical interest must cease."—C. S. MYERS: *In the Realm of the Mind*, p. 75.

Of the various tests employed, nearly every child preferred the picture postcard test. They liked looking at the different pictures; they found it easy to make a choice; and, further, frequently observed "It wasn't too long." On the whole, the Bulley test seemed to be least liked, apparently because they found it more difficult and were very unsure of their judgments. They preferred the McAdory test to the Meier-Seashore because "they did not have to guess so much" and because in the Meier-Seashore test "the pictures were so small": evidently offering a large number of judgments on a large number of small, uncoloured pictures was a strain on the children's attention, and was apt ultimately to induce boredom.

Influence of intelligence.—As we have already noted, tests intended to estimate particular capacities will very frequently owe their correlations mainly to general intelligence, and not to any one specific mental aptitude. This influence, as a rule, can easily be checked and if necessary eliminated. Here, however, the concrete capacity tested, namely, artistic appreciation, depends essentially upon an integration of highly complex processes and experiences. Hence, from what we know of other integrative functions, it is quite conceivable that artistic capacity itself may be merely another manifestation of general intelligence, or at any rate stand in close correlation with it. Actually the suggestion has been put forward that æsthetic appreciation essentially consists in implicity apprehending a pattern of cognitive relations between the sensory stimuli: and intelligence in its turn has been defined as the power of educing, consciously or unconsciously, such cognitive relations. Here is an additional ground for expecting artistic appreciation to be correlated with intelligence.

Accordingly a group test of intelligence was given to all the children. The correlations of the results with the various tests of artistic appreciation are given at the foot of Table IV. When the tests are considered separately, the correlation is not high: the coefficients range from ·15 to ·22. When, however, the average of all is taken, the correlation rises to ·45.

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[1] BURT: *Mental and Scholastic Tests*, p. 318.

These figures may at first sight seem low if compared with the coefficients ordinarily quoted for the correlations between intelligence and other cognitive tests. But it must be remembered that these latter are usually obtained with unselected age-groups. My own figures refer to correlations obtainable within the same school class or within a special type of school: and correlations so obtained are almost inevitably low. With age-groups otherwise unselected Burt found a correlation of ·53 between artistic appreciation and intelligence and ·15 between drawing ability and intelligence.[1]

The size of the coefficients given in Table IV and the fact that the correlation of intelligence happens to be slightly higher with the Meier-Seashore test than with the McAdory (though the difference would not be statistically significant on these results alone) are results which both accord with the figures obtained by Eurich and Carroll, namely, ·26±·02 for the correlation of intelligence with the Meier-Seashore test and 10±·05 for the correlation of intelligence with the McAdory test. I may note that, at the central schools, one of the children who did best in the art tests had the lowest mental ratio with the intelligence tests: both findings were confirmed by the independent opinion of her teachers. Thus it appears that, if artistic appreciation, like everything else involving cognition, depends in part upon intelligence, it nevertheless also depends on a specific aptitude (or, rather, on a number of specific aptitudes) that cannot be assessed by an ordinary test of intelligence or educational capacity alone. This agrees with the conclusions of Carroll and Eurich,[2] of Karwoski and Christensen,[3] and of Burt.[4]

V.—SUMMARY AND CONCLUSIONS.

1.—Burt's picture test for artistic appreciation has been applied, in more or less modified forms, to a number of adults and children, with a view to discovering whether his main conclusions still hold good with different methods of testing and different methods of factor-analysis. Orders of preference were first obtained from a number of expert art critics; and, on correlating the orders for the several persons, it is found that all the chief methods of factor-analysis point to a single general factor as mainly responsible for the orders given.

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[1] *Distribution and Relations of Educational Abilities*, 1917, p. 52.

[2] CARROLL, H. A., and EURICH, A. C.: 'Abstract Intelligence and Art Appreciation.'—*Journ. Educ. Psych.*, 1932, XXV, pp. 214-220.

[3] *Journ. Educ. Psych.*, XVII, pp. 187-194. These investigators tested appreciation for industrial arts, architecture, abstract designs, etc. They found a correlation of 0·28 between the results of the tests and Thurstone's test of intelligence. For this and other reasons they conclude that artistic taste is only slightly dependent upon general intelligence and presumably due either to a special native gift or, at any rate, to a talent that is very early acquired.

[4] 'The Mental Differences between Individuals.'—*Brit. Ass. Rep.*, 1923, p. 16.

2.—Some evidence is also found for specific factors, suggestive of different 'types' of artistic appreciation, apparently related to those first described by Bullough: but, here as elsewhere, the specific factors tend to be swamped by the general factor.

3.—The same test, together with those of Bulley, McAdory, Meier and Seashore, has been applied in group form to over 300 children, and coefficients worked out to estimate the reliability and the validity of each test. The picture test has the highest reliability, and its results agree most closely with the teachers' estimates of the children's artistic capacities.

4.—The results obtained by statistical analysis are confirmed by the results of introspective analysis: in particular, it would appear that the development of artistic appreciation involves a change not only in æsthetic capacity but also in attitude or type. A small positive correlation is found between artistic appreciation and intelligence.

Résumé.

UNE COMPARAISON ENTRE DES TESTS DU GOÛT ARTISTIQUE.

Des tests divers du goût artistique furent appliqués à un nombre d'adultes et d'enfants. L'analyse des facteurs suggère qu'un seul facteur général du goût artistique est responsable des classements obtenus. On trouve aussi quelque évidence de facteurs spécifiques indiquant des " types " variés du goût artistique Il semble que le développement de ce goût renferme un changement non seulement d'aptitude mais d'attitude ou de type. Les résultats obtenus par l'analyse statistique sont confirmés par l'introspection.

Des corrélations tirées d'un groupe de plus de 300 enfants montrent que le test des images de Burt possède la validité la plus élevée, et que ses résultats correspondent le plus étroitement aux opinions des professeurs sur l'aptitude artistique des enfants. On découvre une légère corrélation positive entre le goût artistique et l'intelligence.

Zusammenfassung.

EIN VERGLEICH ZWISCHEN TESTS FÜR KUNSTWÜRDIGUNG.

Man hat Erwachsenen und Kindern verschiedene Tests für Kunstwürdigung gegeben, Faktorenanalyse weist darauf hin, dass ein einzelner allgemeiner Faktor der Kunstwürdigung für die gegebenen Ordnungen verantwortlich ist. Ein gewisser

Beweis ist auch vorhanden für spezifische Faktoren, die verschiedene " Typen " der Kunstwürdigung andeuten. Anscheinend verursacht die Entwicklung der Kunstwürdigung eine Änderung nicht nur im Können, sondern auch im Verhalten oder im Typus. Die durch statistische Analyse erzielten Resultate werden durch Selbstbetrachtung bestätigt.

Korrelationen, die man bei einer Gruppe von über 300 Kindern bekam, zeigen, dass Burts Bildertest die höchste Zuverlässigkeit hat und dass dessen Ergebnisse äusserst genau mit den von den Lehrern gegebenen Würdigungen des Kunstkönnens der Kinder übereinstimmen. Man hat eine geringe, aber positive Korrelation zwischen Kunstschätzung und Intelligenz gefunden.

THE GENERAL INFLUENCE OF STUDIES.

BY WILLIAM PHILLIPS.

I.—*A summary account of modern opinions on the main aspects of mental training.*

II.—*Why do individuals, accustomed to respond in a like way to one situation, react differently from one another to a second?*

III.—*Man's natural tendency to classify his experiences. Some forms that his classifications take become objective situations which each generation must learn to deal with in a uniform way.*

IV.—(*a*) *Common elements, objective and subjective.*
 (*b*) *Attempts made by reference to them, to account for the influence exerted by one study on another.*
 (*c*) *The disuse of the term ' common elements ' recommended.*

V.—*The term ' Transfer of Training ' : its retention defended.*

VI.—*Conditions favourable and unfavourable to the development of the general influence of studies.*

VII.—*Extent to which it can spread.*

VIII.—*Certain causes of pessimism considered.*

IX.—*A secondary-school curriculum favourable to the growth of the specific and general influence of studies.*

X.—*Conclusions.*

PART I.

I.

IN the *British Journal of Psychology* (General Section), Vol. XIII (1922), pp. 1-25, in an article entitled " John Locke on the General Influence of Studies," I attempted to set up five " positions " which should indicate where expert opinion at that time stood in regard to the problems covered by the terms " Mental Training," " Formal Discipline," and the like. I summarise them as follows :

(1) Each bodily and mental operation must be practised by itself if expertness in it is to be gained, and even then many will find it difficult to secure a fairly skilful performance of it.

(2*a*) The effects of such practice are nevertheless not always confined to the particular operation practised, for they may be felt in another, different in some respects from it.

(2*b*) Here I attempted to find a definite meaning for the words " different in some respects from it." I purpose returning to this point ; in fact, it will constitute the main burden of this article.

(3*a* & *b*) This (with special reference to Locke's attitude to the subject under discussion) indicated that, as civilisation advances and the branches of human knowledge become more complicated, the possibility of discovering a method that can be made applicable to the study of them all becomes less and less.

(4) The extent to which a particular person obtains a mastery over any mental or bodily operation or any combination of such operations largely determines whether he will tend to perform others on analogous lines.

(5) A person's capacity for receiving any training at all, and for wisely using and adapting it, when received, depends in the main on his congenital constitution, bodily and mental.

But to return to position 2 (*b*). This was described as follows : " The fact that certain situations contain one or more recurring factors makes it likely that the ordinary mind will notice them and treat the situations in which they occur in a uniform or approximately uniform way. It is also possible sometimes to isolate these factors and consciously compare and contrast them, and so formulate methods or rules for dealing with not only the particular but also the general situations to which they belong."

II.

I was here entering upon the question of how training " spreads." But if it is to be adequately considered, it becomes obvious that it is not enough to assert that " certain situations contain one or more recurring factors." We must in addition give special attention to a correlated matter, viz., " Why does one person, having reacted to a certain situation in a particular way, treat another in a manner which possesses considerable, maybe a very large measure of similarity to the first (thus giving rise to the impression that both situations contain like or identical parts), while another person who made the same kind of reaction as his fellow to the first now makes no response at all to the second situation, or one very different from his original response (so giving rise to the impression that the two situations contain no similarities)."

The answer is of course to be found in the original constitution, history and development of each of the two persons concerned, and in the nature and force of their present needs, and not merely in the situations to which they had to react. For, from the point of view of two situations, nothing could apparently be so entirely dissimilar as the fall of an apple from a tree and the motion of the moon round the earth. Nevertheless, Newton came to realise (I beg my sceptical readers to grant me the use of the old story), that the two phenomena were governed by an identical law.

III.

But the tendency which a person who has learnt to meet a particular situation in a certain way sometimes displays when he deals with another, in a manner ranging in similarity to the first from an almost complete to a small degree, is not always left unguided, for it may be that for many generations his ancestors, especially those of them who were law-givers and teachers, had, for diverse reasons, generally of a practical nature, been accustomed to meet certain situations, including the two under consideration, by placing them in one class, and had emphasised the advantage of employing certain measures for meeting them; these, having been systematised, and, in some cases, formulated in oral or written language, were deliberately handed down from one generation to another, and finally to him.

But this process of classifying situations and systematising methods for coping with them was slow in its evolution and uncertain and imperfect in its results. As one instance of the way in which primitive man, without any deliberation or even clear awareness, met situations in which such various objects and phenomena as trees, animals, rain, snow, etc., recurred, we may take his habit of giving names to them. This was largely unsystematic in its character, but not essentially so, for a human being cannot help making some sort of classification of his experiences; this, when not submitted to conscious criticism, is very imperfect, indeed, it never sloughs off all its imperfections. For instance, even to-day, many otherwise well-informed people call limes elms, and elms limes.

As this process of responding to acts, phenomena, etc., by language, becomes increasingly conscious and deliberate, more than one concrete form is given to the results; they may be expressed in a visible as well as a vocal form. Also, the various types of statement, question and command which come into being, and the 'rules' of Accidence and the 'laws' of Syntax based in a later age on them, become in their turn external *situations* to which each member of a civilised community, including the child, must learn to react in a uniform way. We know that all men, especially those belonging to such 'races' (*absit omen*!) as the Greek, Roman, Teutonic or Celtic, deal with external and internal experiences in many similar ways, and in spite of numerous differences, we see this embodied in their languages ; this fact is more clearly realised when a comparison is instituted between their grammars. Furthermore, because of well-known historical reasons, a strong tendency has, for many centuries, shown itself in the civilised countries of Western and Northern Europe to treat Latin grammar as a standard by which that of others, e.g., English, had to be drawn up. Rules of Latin grammar that were often (not always), rightly based on that language were applied to English ; for example, children are still occasionally taught that the English finite verb agrees with its subject in person and number ! William Salesbury introduced Latin forms into Welsh, and a similar attempted standardisation appeared in a dangerous form in Welsh Syntax about a century ago : fortunately, it failed to gain permanent adoption.

IV.

(*a*) But in spite of this tendency to literal and improper imitation of a grammar possessing a certain status, the use in most languages of certain grammatical terms and syntactical rules was found helpful, and it could be foretold that this would, after proper instruction, be felt by every normal person. For this reason these common factors found in English, Latin and certain other languages, were sometimes called *Identical Objective Elements*, and whether this is a proper designation for them or not, it was rightly thought that when account was taken of them, a study of one grammar, e.g., Latin, could be made to help the student in securing a mastery of the grammar of others, such as English, Welsh, etc. I need not add that the ease with which this could be effected was greatly over-estimated, and the conditions essential to success often ignored. (It will of course not be overlooked that these objective elements are direct expressions of subjective forces.)

Such ' Objective Elements ' as these were then distinguished from certain uniformities that were observed in various mental processes employed in dealing with external situations as, e.g., the use of imagery by some of Fracker's subjects[1] in the difficult and ungrateful task of listening to and remembering the order in which each of two groups of four tones was heard by them, then reproducing the order in which the first group had been presented while still keeping in mind the order of the second ; next, listening to the order of a third group of four, then reproducing the order of the second group while trying to retain the order of the third ; and so on. It was a task which would have been given up in despair except by keen psychological students as Fracker's testees were. Both before and after the training in this work with the four tones, the testees were examined in their power of remembering and reproducing other experiences, especially that of dealing with the seeing of groups of four grays : this involved the use of a method like that used with the four tones. The preliminary and also the final tests with the grays, etc., made it clear that imagery was used by most of the subjects in dealing with them. These uniformities (in so far as they existed) in mental processes were also, with still more questionable propriety, designated 'Elements,' and, in order to distinguish them from 'Objective Elements' were called 'Subjective.'

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[1] GEO. C. FRACKER : " On the Transference of Training in Memory," pp. 56-102 in *Monograph Supplements* (*Psychological Review*), Vol. IX (1908). I have selected Fracker's work on which to base so large a part of my discussion, because the main aspects of the problems that must be considered in any adequate treatment of " Mental Training " are included in it. Although his work is not in all respects conclusive, it does nevertheless supply a detailed examination of the terms usually employed in this field, and his explanation of " Transfer " has had a deep influence on subsequent writers.

Man did not, for a long time, find it necessary to give concrete expression to the particular images which he experienced, but when he at length felt a desire to do so, he already had a means at hand for the purpose ; he could have recourse to the concrete expressions he had learnt to give to the things and phenomena perceived by him : these he then also employed when he wished to refer to his mental images of them, but the picture or model or whatever it was that was thus employed was not thought of as a representation of the image, but of the tree, the running animal, etc., imagined.

The next 'Element' to which special attention was paid in discussions on our topic was Rhythm. Its importance both in its objective as well as its subjective forms in facilitating certain bodily and mental performances is well known, and the tendency to employ it, either with or without training, has often been noted. Fracker reports that in the case of himself, "the visual-auditory imagery used was that of a localization in space of the four tones. When in the test experiments the four tones were changed to grays, there was a strong tendency to remember the grays in the same manner as the tones were remembered, because the stimulus rhythm and the method of response were the same."[1] However, when we turn to the accounts[2] given of the way in which the four tones and grays were presented to the testees, we find that any sub-grouping of the sets of four and any accentuation of one or more of the individual stimuli were avoided : each tone and gray were presented as a separate unit. The use of the term 'stimulus rhythm' is therefore unjustifiable.

[1] Op. cit., p. 93. [2] Op. cit., pp. 59, 61.

Elsewhere, the author reports a different aspect of the use of rhythm. " (One of) the essentials of method," he says, " in training (the ability to retain and reproduce the order of the four tones) was the appearance of rhythms in the ability to hold the image—changes in attention."[1] Sleight also calls special attention to the considerable use made of rhythm by his child testees.[2] This has been observed and discussed by many other writers.

Rhythm is, in one respect, obviously different from imagery, in that we tend to give a concrete form to the former in bodily movements, musical performances, etc. But it does not of course necessarily belong to such a task as the reproduction of a once-heard series of numbers, such as 7, 8, 5, 4, 1, any more than imagery does. When rhythm appears, its expression is most commonly muscular in character, such as that which some learners (though not all) adopt in trying to reproduce what they have just heard, or in repeating it in order to secure greater hold over it. The two processes, imagery and rhythm, sometimes occur together. In trying to picture soldiers marching, or to reproduce the rhythm of a song or poem, recourse is often had to images, while the attempt to retain kinaesthetic and auditory images is aided by arranging them in rhythmical groups. But, as already said, man has from the earliest times given external form to certain rhythmic experiences ; for example, he beats a drum, claps his hands, etc., and, for this purpose, adopts regular sequences of strong and weak beats ; these he has gradually elaborated into complex dances and like artistic products. Imagery, on the other hand, remained in its various species without any regular external form. Imagery is never anything but subjective : rhythm is sometimes objective and sometimes subjective.

Unfortunately, other highly important but less observable mental processes than imagery and rhythm tended to be ignored ; e.g., the relating of one experience to another, the comparing, contrasting and classifying of others, the process of abstraction, etc.

(*b*) By recourse to a theory of similar or common or identical *objective* elements, an explanation was often sought for the influence exerted on a particular mind by its past experience, as seen in the altered response made by it to a subsequent situation. The epithet most generally used was " common," and too often no indication was given as to whether it meant " similar," but not " identical," or whether it covered all degrees of likeness, including identity. The word " objective " was, as we have seen, introduced because it was believed that the cause of the effect produced by one study on another was to be found in the *data* contained in both. In this way the importance of the material dealt with was exaggerated, and matters were made worse by calling each of these data an 'element,' for this term cannot help carrying with it a very strong suggestion that whatever is so described cannot be subjected to analysis.

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[1] Op. cit., p. 78.

[2] W. G. SLEIGHT : " Memory and Formal Training."—*Brit. Journal of Psychology*, IV (1912), esp. pp. 424, 426. Cf. also his book *Educational Values and Methods* (1915), p. 69.

The following may be taken as one form of the attempts made to formulate a theory of the influence, or spread, or transfer, of training by aid of identical *objective elements.* It has been thought by some that if a piece of work 'A', splittable into various elements of which *e* is one, has been well practised, then any other task ' B,' splittable into elements, of which one is *e*, and so identical with 'A' in respect to it, will be better and more easily performed, i.e., transfer of power gained in 'A ' will pass over to ' B.' For instance, let 'A' be the task of adding together 8, 3, and 7 (let the method be that of ' making up tens '), and ' B ' the addition of 8, 5, and 9. Here we start with the same so-called element, viz., 8, and when the learner knows what it means (but this, of course, will involve a knowledge of the components into which it can be resolved, and of its relation to 10), the work done on 'A' will facilitate that to be done on ' B.' Take two other tasks, ' C ' and ' D '—' C ' involving the addition (by the same method) of 7, 3, 4, and 8, and ' D ' the addition of 5, 9, 2, and 8. Here it becomes still clearer that to regard 8 as a common objective element in the two operations is inadequate and misleading, for in ' C,' the pupil ought to say " 7 and 3 are 10, 10 and 4 are 14, 14 *and* 6 *are* 20, 20 and 2 are 22," and in ' D,' " 5 and 5 are 10, 10 and 4 are 14, 14 and 2 are 16, 16 *and* 4 *are* 20, 20 and 4 are 24." In ' C,' as soon as the stage ' 14 plus 8 ' is reached, the point to be determined, namely, which components of 8 are to be chosen, is not to be settled merely by a knowledge of them all, but also by discovering first of all that component which constitutes the difference between 14 and 20 ; in other words, by what an adult would call x as in $14+x=20$. The feeling, however, in a child's mind for what corresponds to this x is often vague ; so, in spite of the fact that the components of 8 remain identical, and a child may know them he may yet be unable to add 14 and 8. So with $16+x$ in ' D '.

The word " eight ' when pronounced and the symbols 'eight' and ' 8 ' when written or printed are objective representations of certain subjective facts which come to be treated uniformly by all normal minds. The child must learn to respond to these objective phenomena—the sound of the word ' eight ' and the appearance of it in the forms ' eight ' and ' 8.' These are two out of the very many objective forms into which the human mind has cast its products. But as already said, in adding together two numbers, one of which is 8, it is misleading to describe it as an 'element' which requires the same response from the young learner in every case.

Let us next consider the reaction required from a child who is asked to deal with what is, at first sight, another common objective element viz., 'flag,' as in the two sentences: 'He planted a flag on the tower' (A); 'He planted a flag on the river-bank' (B). But no determination of the meaning of 'flag' is possible in either case by a mere reference to 'A' or 'B': the wider context to which each belongs must be provided.

It follows therefore that the use of such diagrammatic comparisons as those given above, in all of which 'e' appears, is misleading. Although Fracker, among others, makes use of similar alphabetical analyses, he does not fail to point out that "we must guard against the conception that any mental components of a complex act enter into another complex without being modified."[1]

We may now look at another formulation of the way in which some have tried to make a transition from their use of 'objective' to 'subjective elements.' "Expressed in mental terms, the theory of the common elements asserts that whenever two psychical functions have identical elements, there transfer will take place." Let us try to apply it to the experiences of some of Fracker's testees. It will be remembered that two of the tasks assigned to them consisted of the retention and reproduction of the order in which (*a*) four tones of the same pitch but different intensities were heard, and (*b*) four grays of different intensities were seen (the answers had to consist of permutations of the numbers 'one,' 'two,' 'three,' 'four,'—'one,' e.g., representing the most intense tone or the darkest gray): both tasks contained, in spite of the fundamental unlikeness of tones and grays, similarities in the number of items to be reproduced, in the necessity for retaining the second (or third, etc.) group until the time came for reproducing the first (or second, etc.) group, and the use of number-names in the answers. It would seem to me, however, wrong to say that the improvement shown by the subjects in dealing with the four grays in the last tests (following the special training they had undergone in the matter of the four tones), as compared with the tests applied before the training, depended on the likenesses named. It was due rather, in most cases, to the use of imagery, for, in the final tests with the grays, "every trained observer but one says that the (imagery) method developed in the training, helped in securing a better record."[2] That it was not however inevitable for imagery to be used for the grays is proved by the fact that of the four testees who did not take the tone-training, one did not use that method and another dropped it in the final test.[1] Neither was it inevitable for imagery to be used in remembering the four tones: one did not employ it.[2]

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[1] FRACKER.—Op. cit., p. 86. [2] Op. cit., p. 79.

The actual fact is (as already indicated) that when a person (not merely his memory or imagery or any other of his mental or emotional processes, but rather his whole psychophysical nature), has responded to certain situations, and he has, in consequence, adopted a particular attitude towards them, and used a particular method (e.g., the use of imagery, the arrangement of material in a rhythmical way, reading aloud what is to be memorised, as in Culverwell's classic case,[3] the application of the inductive or deductive method, etc.), it is then that he may perhaps be affected by another situation in such a manner as to lead him to adopt the same attitude towards it, and apply the same method for meeting it, and those mental and bodily acts which were previously favoured will tend to be performed again. This is well illustrated, as we have seen, in the case of most of Fracker's testees. There was for them a partial or complete, a conscious or unconscious or partly conscious, recognition of the fact that the two tasks of dealing with the tones and grays, different as they were in several respects, had a form of considerable similarity, and since imagery was the special process they had adopted for dealing with the one task, they again employed imagery in coping with the other. We postulate that they felt an analogy between the form of two tasks which were nevertheless marked by considerable diversity.

We therefore seem justified in holding that in the consideration of how one study influences another, the use of the term 'common element (objective or subjective)' is not only unnecessary, but misleading.[4] We should rather say that the pursuit of a study produces results which may, for convenience sake, be divided into two broad classes; the one, again for convenience sake, may be entitled specific, and the other general: these are of course in actual operation inseparable. The specific results consist of a familiarity and a taste (or distaste) for the data and special methods employed in it, and the general in a subconscious or conscious recognition that it possesses a certain 'form.' When the latter is felt to exist in a second study, the tendency may manifest itself to apply the method employed in the first in dealing with it. Likewise the specific data and methods used in one subject are sometimes, in either an unchanged or modified form, needed in a second: arithmetical facts and processes enter freely into algebra, and some formulations of the regularities found in Latin are applicable, but with many modifications, in English. The suggestion, however, that similarity of material in two subjects justifies the compulsory pursuit of both (although one may soon be dropped), because each throws light on the other, is often put forward ; an examination of its validity must however be put off to a later part of this paper.

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[1] Op. cit., p. 82. [2] Op. cit., p. 71.

[3] E. P. Culverwell: "The Creation of a Memory."—*Journal of Exp. Pedagogy*; I (1911-12), pp. 160-1.

[4] Sleight arrives at practically the same conclusion. See Chapter IV, and especially pp. 79-81, of his already-quoted book.

V.

In the preceding sections, it has been seen that the term ' transfer ' is used by various writers to indicate that one set of operations has exerted an influence on the way in which a second set is performed, although the latter may not to many appear to be like the former. Now, as the word ' transfer ' has, in its ordinary use, almost invariably an active rather than a passive meaning, it would seem desirable to restrict its employment to the cases in which the person concerned consciously and intentionally controls the performance of the second on lines adopted in carrying on the first operations. If there is any force in this suggestion, it is unfortunate that Fracker whose experimental study is so valuable (in spite of the fact that his statistical results are not fully satisfactory, and that in trying to account for the spread of training, he attaches too great a rôle to imagery), decided to use the term for the more unconscious effect of the one set on the other. " We may mean by transfer," he says, " the ability to use in one act the elements involved in another act. If we mean by transference that the training one receives in using a number of elements in one act is transferred to another act in which these elements do not occur, then the phrase ' spread of training ' would describe our meaning more accurately. In the sense of ' spread of training,' we can hardly say there is ' transference ' . . . In the case of ' spread of training ' if we had an act composed of the elements *a*, *b*, *c*, *d*, *e*, and another act composed of the elements *f*, *g*, *h*, *i*, *j*, then the influence of training in the first act upon the elements composing the second act will be measured by the amount of relationship[1] between the elements of the two acts, that is, it will be measured by the amount of subconscious and actively conscious connection made between the elements by the observer."[2] He realises however the uselessness of speaking of relationship between objective elements, for he adds : " Of course, it were to beg the question if we used the phrase ' natural connection ' (between elements) or the phrase ' a natural relationship ' . . . The relation between the things in experience depends . . . upon the relation which each person establishes in his own life."[1] But he is still uneasy on the matter of terminology, for, he says, " if the difference [between the training and the test] is so very slight that the elements are practically identical, as between the four tones of the training series and the four grays [!], there is little difference between the gain of the training and the test series. We have here something of the nature of transference, though transference as we have defined it, demands a complete identity between the elements of the acts."[2] It is not strange therefore that Fracker's suggestion regarding the way in which the term ' transfer ' should be used has not been adopted.

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[1] A discussion of this and allied points by S. F. Jackson, " Proportional Transference, and the Theory of Common Elements," *Journal of Exp. Pedagogy*, III (1915-16), should be consulted.

[2] FRACKER.—Op. cit., p. 85.

The educator obviously needs a term to describe the effect which a course of training in one or more directions has upon an operation subsequently performed, first when the student is not aware of the reason or the method by which he is, in doing the second, affected by the training, and secondly when he realises that the method adopted in the training work can be and is applied by him to a later task. The term ' spread of training ' is suitable as a description of the first and second, and ' transfer ' of the second, for ' transfer ' is a sort of ' spread of training,' but of a systematic and conscious kind.

Among the researchers into various aspects of mental training whose work has been examined by Fracker, three receive special attention, viz., Thorndike and Woodworth on the " Influence of Improvement in One Mental Function on the Efficiency of other Functions " (1901), Ebert and Meumann on " Memory Training " (1904), and Coover and Angell on the " General Practice Effect of Special Exercise " (1907). Criticisms[3] levelled at the two latter investigations have weakened confidence in the conclusions drawn from them by their authors, but the first-named, partly because of the numerous and stimulating enquiries made year by year by Thorndike, still continues to attract attention. The conclusion he and Woodworth arrived at were set out by Thorndike in his book " Principles of Teaching " (1906), and the possibility of one activity effecting an improvement in others is made to depend on the presence of common elements in them.[4]

The little help this explanation has given in solving the problems involved in mental training, and the view once held by Thorndike that " training the mind means the development of particular independent capacities,"[5] has prevented some from paying due regard to his warning that the advocates of the disciplinary value of studies over-estimate " the probability of the acquisition of valuable ideas and ideals of method and attitude, especially by young children. Such *may* come from special discipline with one study or another, but unfortunately they rarely do."[1]

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[1] Op. cit., p. 86. [2] Op. cit., pp. 101-2.

[3] See, in particular, THORNDIKE (on Ebert and Meumann's work), *Educational Psychology*, Vol. II (1913), p. 369.

[4] E. L. THORNDIKE : *Principles of Teaching*, 1906, pp. 243, 244.

[5] Op. cit., p. 248.

Ruger thought it advisable " to use the term transfer in a very broad sense to include the effect of any given experience on any subsequent one whether the effect results directly or by means of an idea, whether the transfer is one of method, or of material, or of motor processes, and whether it is positive or negative." He would also include " the transfer from one region to another of specific information useful in two or more fields (mathematics to physics)."[2] With reference to Fracker's distinction between " transfer " and " spread of training," he remarks that " if the relation (between two operations) is seen and employed, you seem to have a common element after all, and it would appear to be better to consider them both as cases of transfer, but to make the distinction between (*a*) transfer of the direct, necessary or reflex type, and (*b*) transfer of the conditional sort, dependent on an act of analysis."

After taking this and similar discussions of the term " transfer " into account, I must confess that although such a term as " the general influence of studies," which may be wholly or partly subconscious or conscious, or partly subconscious and partly conscious, is free from objection, nevertheless, in regard to a person's deliberate employment in a new situation of the methods or rules he has previously developed, the retention of the term " transfer " is not only justifiable but also desirable.

Archer however thinks it a mistake to speak of " transfer " at all. What he suggests ought to be emphasised is the importance of training *big general tendencies*, such as the habit of making sure that you understand statements, the habit of receiving them critically, the habit of demanding proof . . . " The Atomists appear to regard habits as associated with particular kinds of subject-matter. Thus, if a habit formed in connection with the study of motion and equilibrium is exercised in studying the factors involved in the production of commodities, it is said to be ' transferred ' from mechanics to commodities ! The truer conception is that mental habits are associated with the form and not with the content of thought. What counts is whether the pupil has learned facts, or has followed trains of deductive reasoning, or has worked out such transfers for himself . . . or has worked statistics into concomitant tendencies, and so on. When he does the same thing with other subject-matter, there is no essential difference in the process, no need to speak of ' transfer.' "[1]

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[1] Op. cit., p. 245, note 1.

[2] H. A. RUGER : "An Experimental Study of the Processes involved in the Solution of Mechanical Puzzles and in the Acquisition of Skill in their Manipulation."—*Archives of Psychology*, No. 15, June, 1910, p. 85.

For reasons advanced above, I cannot accept this view that we have no need of the term " transfer." Take, for example, a simple case like the following. The teacher wishes to train young pupils in making a full and correct description of natural objects. We shall agree with Rennie that " at the commencement at all events of such work (they) should receive some suggestion as to the order in which to proceed,"[2] and if the examination is to be (say) of fruits, we may accept his recommendation to exercise the pupils along some such lines as the following : " Description to include reference to size ; shape ; colour ; nature of surface ; consistency . . . ; odour ; taste and edibility."[2] When the scheme has been utilised in dealing with one fruit after another, and its value realised, it will not only tend to establish itself in the pupils' minds, but also prepare them to accept the use of a similar outline in the inspection (say) of shells, and, in time, the application of a ' scheme ' for preparing similar detailed reports on a group and its items will become a deliberate decision. The idea of utilising a ' scheme ' will be transferred from the examination of one group to another. Likewise, at a higher plane of intellectual work, the enquirer into such a problem as the growth of unemployment will undoubtedly at many stages in his search be controlled by so fruitful an idea as that suggested by the word " evolution."

If the restriction of the term " transfer " to designate such a deliberate process as the one just referred to is not generally acceptable, it would at least be well to follow Ruger's advice, firstly to retain the word, and secondly to add, in each case, whether one is referring to its conscious or unconscious use.

Hamley also seems to favour its retention, but suggests it may best be defined as " communication." " Transfer of Training," he says, " is not merely the communication of knowledge or ideas ; it is the communication of life, of knowledge and ideas suffused with life."[3] The psychological processes on which " transfer of training'" depends do not seem to be cleared up by describing them as forms of communication, and the statement that " transfer is a communication of *life* " is too general to be helpful : indeed, to describe even education as a whole as " a communication of life " is not, because of its vagueness, to be recommended.

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[1] R. L. ARCHER : " The Disciplinary Value of School Subjects."—*Forum of Education*, III (1925), pp. 180-1.

[2] J. RENNIE : *Nature Study*, p. 76.

[3] H. R. HAMLEY : " Formal Training : A Critical Survey of Experimental Work."—This *Journal*, VI (1936), p. 242.

(*To be continued.*)

(*Résumés in French and German will be given at the end of Part II in the next number.*)

A FURTHER STUDY OF THE COMPARATIVE INTELLIGENCE OF CHILDREN IN CERTAIN BILINGUAL AND MONOGLOT SCHOOLS IN SOUTH WALES.

By ETHEL M. BARKE and D. E. PARRY WILLIAMS
(from the Education Department, University College, Cardiff).

I.—*Introduction.*
II.—*The Tests: Mental and vocabulary tests in English and Welsh, and a non-language mental test.*
III.—*The Subjects: Children from bilingual, monoglot, and 'combined' schools.*
IV.—*Procedure.*
V.—*Results:*
  (*a*) *The monoglot or control group: scores.*
  (*b*) *Mental tests in all the schools: scores.*
  (*c*) *Vocabulary tests: scores.*
  (*d*) *Correlations of mental tests with vocabulary tests, and inter-correlations of mental tests.*
  (*e*) *Comparison of scores in vocabulary tests and mental tests. Discussion of results.*
VI.—*Conclusions.*

I.—INTRODUCTION.

SOME years ago an extensive investigation of the intelligence of bilingual children in parts of mid-Wales was conducted by D. J. Saer, who found that rural bilinguals were distinctly inferior to rural monoglots when measured by Binet Intelligence tests. He formed the conclusion (partly from the results of the rhythm and dextrality tests which he gave) that this inferiority was due to an emotional conflict in the bilingual child—a conflict that arose between his self-regarding sentiment and his instinct for submission when he found in school another language superseding his home language.[1]

A further study of Saer's problem was made by one of the present investigators, who compared the intelligence of bilingual children in a Welsh-speaking mining district with a similar group of monoglot children in an English-speaking mining district. She found that while the bilinguals were distinctly inferior to the monoglots in a verbal Mental Test, which was given to both groups in English, they were slightly superior to the monoglots in a Mental Test from which language was entirely excluded.[1]

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[1] SAER, D. J.: "The Effect of Bilingualism on Intelligence."—*Br. J. of Psych.* Vol. XIV (1923), p. 37.

This investigation is a continuation of the previous one. In this case the bilinguals were given Mental Tests in Welsh as well as in English, while the same two tests were taken by a similar monoglot group in English, so that a comparison could be made of the respective achievements of the two groups in each test.

A Performance Test was given, as previously, in order that it might be seen how the two groups compared in a mental test in which language was not used.

Further an attempt was made by means of Vocabulary Tests in Welsh and English to get some indication of the extent to which success in a verbal Mental Test is conditioned by actual word-knowledge, apart from any consideration of a possible mental conflict such as was detected by Saer.

II.—THE TESTS.

The tests used were as follows:

(1) The 1932 Mental Survey Test of the Scottish Council for Research in Education (in English and Welsh).

(2) Northumberland standardised Tests: General Intelligence, 1925 Series, by Cyril Burt, D.Sc.

(3) Non-Language Mental Tests, by R. Pintner, Ph.D.

(4) Thorndike Test of Word Knowledge: Form A (in Welsh), and Form B.

With the kind permission of Professor Godfrey Thomson and the Scottish Council for Research in Education. and of Professor Thorndike and Teachers' College, Columbia University, respectively, Welsh versions were made of the Scottish Mental Test and of Thorndike's Test of Word Knowledge, Form A.

It should be noted here that there are certain difficulties in making a satisfactory Welsh translation of an English test for young schoolchildren: in the first place, because Welsh orthography is not entirely standardised, and children may be baffled by unfamiliar spelling; in the second place, because vocabulary and forms of expression vary from one district to another. The translator states that although most of his

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[1] BARKE, ETHEL M.: "A Study of the Comparative Intelligence of Children in certain Bilingual and Monoglot Schools in South Wales."—This *Journal*, Vol. III (1933), p. 249.

Welsh renderings in the tests are translations, he has in a few cases inserted Welsh words of different meaning, but of like difficulty ; in some cases he has retained the English words of the original version.

The aim was to make the translation as far as possible in the sort of Welsh that would be best understood by the particular group of children to be tested. The Northumberland and Pintner Tests were used in the previous investigation and described in the report on it.[1] The Scottish and Northumberland Tests are fairly similar in content, but the Scottish Test differs from the other in two important respects :

(1) The candidates are given a short practice test before doing the test proper.

(2) The different types of problem are scattered throughout the test, and the candidates work continuously through the test without interruption.

In the Northumberland Test the different types of problem are grouped together and a fixed time is allotted for each group, at the end of which a signal is given, and the candidates have to pass to the next group of problems. The Thorndike Test of Word Knowledge has four alternative Forms—A, B, C, D, and each form has 100 words of corresponding ' importance ' taken from a graded list of 10,000 words. In this investigation the first 75 words of Form A translated into Welsh, and the first 75 words of Form B (in English) were used. The test has been found adequate in U.S.A. to measure the vocabularies of pupils up to and including Grade X, that is up to the age of 16 years.

III.—THE SUBJECTS.

The intention was originally to give the tests in the same schools as before, but owing to reorganisation and other changes this plan had to be somewhat modified, though the schools now used were in the same mining districts as previously. The age-range selected was that of the Scottish Mental Survey, 1932, in order that advantage could be taken of the norms then established. Thus all pupils in the selected schools were taken whose ages ranged from 125 to 137 months, that is roughly speaking, from 10½ to 11½ years.

The examinees fell into three groups, bilingual, ' combined,' monoglot, each drawn from two schools. In the first group are 54 pupils of the two mixed bilingual schools (A and B) that were previously tested. All but 7·4 per cent of the pupils speak Welsh at home ; the medium of instruction in the Infant Departments of these schools is Welsh, for which English is gradually substituted in the junior standards. In the second group are 47 pupils of a boys' school (C) and a girls' school (D), situated only a few miles away from the first group of schools. But in this case, while 55·3 per cent come from Welsh-speaking homes, the remaining 44·7 per cent speak English only at home. Welsh is, however, the language of the Infant Departments of these schools, and is frequently used in the junior school, so that all the pupils have some knowledge of Welsh. The third or monoglot group of 100 children was drawn from the same district as before, but the schools had been reorganised in the meantime, and this group was taken from the two mixed junior schools (E and F). Only 3 per cent of these children speak Welsh at home.

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[1] Op. cit., p. 239.

IV.—PROCEDURE.

Every pupil of the age-range stated who was present on the day (or days) of the examination. took the three Mental Tests and the English Vocabulary Test (Form B). But whereas in the bilingual and ' combined ' schools the Scottish Test was given in Welsh, in the two monoglot schools it was given in English. The bilingual and ' combined ' schools also took the Welsh Vocabulary Test (Form A).

The Scottish Test (in Welsh and English) and the Welsh Vocabulary Test were given by the Welsh-speaking collaborator.

V.—RESULTS.

(*a*) *The monoglot group* (Schools E and F).

Before surveying the general results it is advisable to examine the results of the monoglot group given below (Figure 1 and Table I) since it acts as a control group indicating in particular the relative difficulty of the two verbal Mental Tests.

The median I.Q. for the Northumberland Test is lower by 7·67 points than the median I.Q. for the Scottish Test. If a comparison is made with the results of the Northumberland Test for the monoglot schools in the previous investigation, it is found that the average of the median I.Q.'s of the 10 year and 11 year groups is 92·35, which is very close to the present median 93·33. This median is also much nearer the median I.Q. for the non-language Test (88·07) than is the Scottish median. How then is the high Scottish median to be accounted for ?

DISTRIBUTION OF THE I.Q.'S OF THE MONOGLOTS IN THE TWO VERBAL MENTAL TESTS.

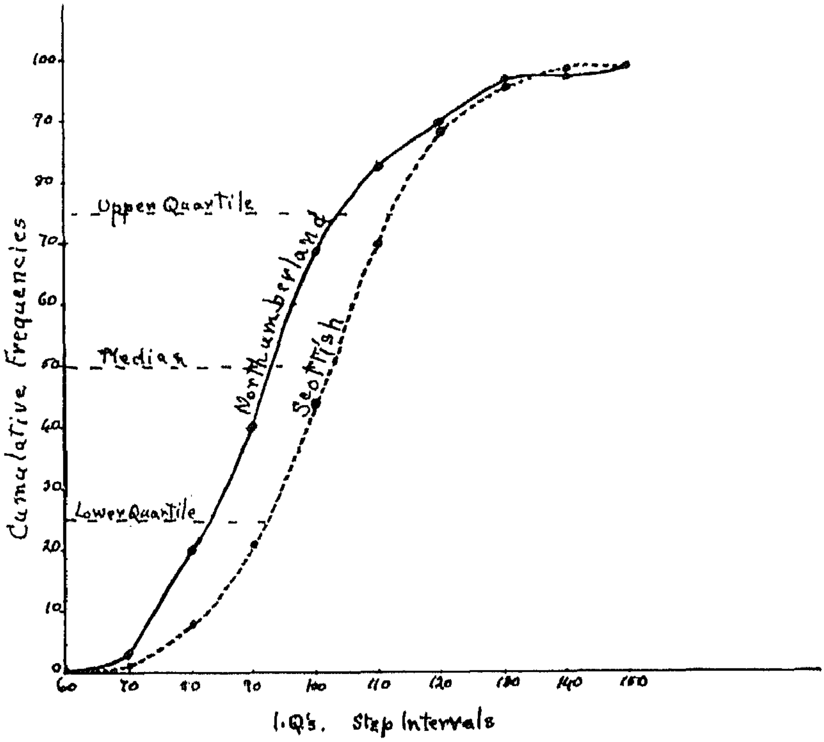

FIG. I.

OGIVE CURVE: SCOTTISH AND NORTHUMBERLAND I.Q'S. MONOGLOT SCHOOLS E AND F (100 PUPILS).

TABLE I.

Subjects.	*No.*	*Scottish Test.*		*Northumberland Test.*	
		Median I.Q.	*Interquartile Range.*	*Median I.Q.*	*Interquartile Range.*
Monoglots . . (Schools E. and F.)	100	101	92–111·25	93·33	82·55–105·35

(1) It may be that the children found the Scottish Test easier than the Northumberland, because it is an "omnibus" test, and they could work right through at their own rates without interruption.

(2) The practice sheet may have had a considerable influence on the results, as these children were entirely unaccustomed to mental tests. The greatest benefit from this preliminary practice would be derived by the duller children who are slow to grasp the meaning of a new type of problem, and a glance at the interquartile ranges of the two tests (see Table I and Figure 1) shows that it is at the lower end of the list that the superiority of the scores in the Scottish Test is the more marked.

If these two considerations do not fully account for the relatively high median I.Q. of the Scottish Test, there is a possibility that the instructions with regard to the *Practice Sheet* may have been interpreted rather more liberally in this investigation than was the case in Scotland. However, as the same examiner gave the Scottish Test to all the children, whether they took the English or Welsh version, the conditions of the test were the same for the bilingual, 'combined,' and monoglot schools, and consequently comparisons can be made of the relative performances of these three groups in the tests. Although the range of I.Q.'s is higher on the Scottish than on the Northumberland Test, the two tests are found to have a satisfactory correlation: for the raw scores the coefficient is ·860.

As regards the Pintner non-Language Test (see Table II) the median I.Q. (88·07) is 5 points lower than the Northumberland median (93·33). Similarly in the previous investigation the pupils of 10 and 11 years in the monoglot schools scored more highly on the Northumberland than on the Pintner Test. (See Table of Mental Ages).[1] The lower scores of the Pintner Test are possibly due to the more unusual nature of the test. There is a fair amount of correlation between this test and the two verbal intelligence tests. (See Table VI.)

(*b*) *Comparison of results of mental tests in the three groups of schools.*

The range of I.Q.'s in the three mental tests for the three groups of schools is shown by the graphs (Figures 2, 3, and 4).

The median I.Q.'s are given in Table II.

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[1] Op. cit., p. 244.

DISTRIBUTION OF THE I.Q.'S OF THE BILINGUAL, MONOGLOT, AND 'COMBINED' SCHOOLS IN THE SCOTTISH TEST.

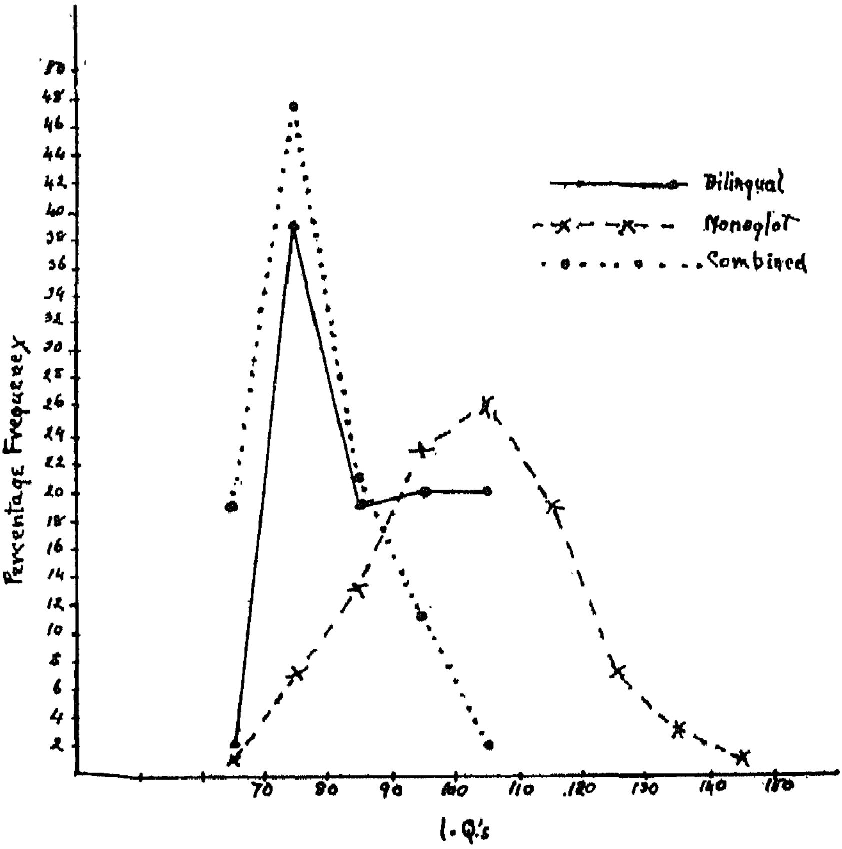

FIG. II.

SCOTTISH TEST: DISTRIBUTION OF I.Q.'S.[1]

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[1] I.Q.'s below 80 can only be regarded as approximate.

DISTRIBUTION OF THE I.Q.'S OF THE BILINGUAL, MONOGLOT, AND COMBINED' SCHOOLS IN THE NORTHUMBERLAND TEST.

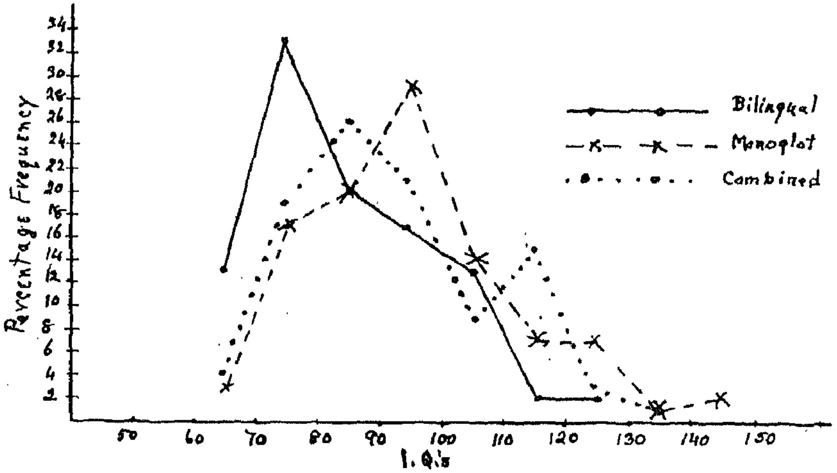

FIG. III.

NORTHUMBERLAND TEST: DISTRIBUTION OF I.Q.'S.[1]

DISTRIBUTION OF THE I.Q.'S OF THE BILINGUAL, MONOGLOT, AND 'COMBINED' SCHOOLS IN THE PINTNER TEST.

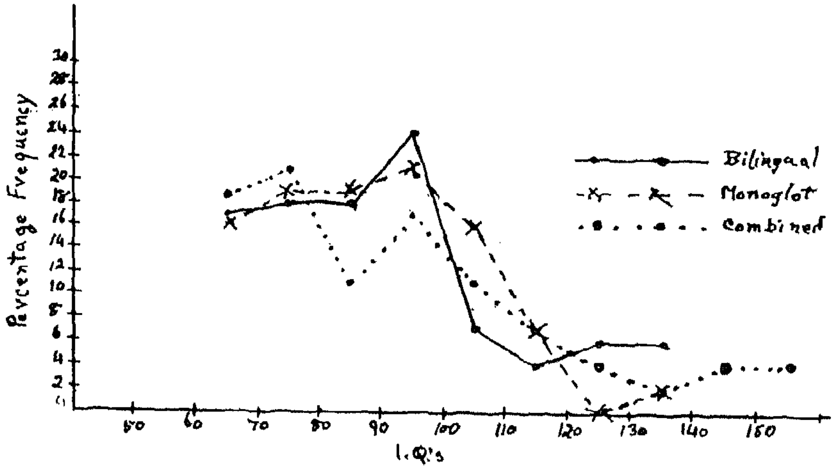

FIG. IV.

PINTNER TEST: DISTRIBUTION OF I.Q.'S.[1]

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[1] I.Q.'s below 80 in the Scottish Test and below 70 in the Northumberland and Pintner Tests can only be regarded as approximate.

TABLE II.

MEDIAN I.Q.'S IN THE THREE MENTAL TESTS.

Schools.		*No.*	*Scottish (in Welsh).*	*Northumberland.*	*Pintner.*
Bilingual	School A (mixed)	18	86·5	89·64	89·95
	,, B ,,	36	83·5	77·53	86·13
	,, A and B	54	85	82·20	88·42
'Combined' 55 per cent Bilingual	School C (Boys)	26	74·5	88·28	82·21
	,, D (Girls)	21	80	90·84	94·98
	,, C and D	47	76	90·84	88·56
	Schools C and D (bilingual)	26	79·5	86·12	88·43
	,, C and D (monoglot)	21	73	92·66	91·16
			Scottish (in English)		
Monoglot	School E (mixed)	28	101	96·36	90·73
	,, F ,,	72	102	91·66	83·72
	,, E and F	100	101	93·33	88·07

TABLE III.

COMPARISON OF MEDIAN I.Q.'S IN THE BILINGUAL AND MONOGLOT SCHOOLS.

Schools.	*No.*	*S.I.Q.*	*N.I.Q.*	*P.I.Q. (non-language)*
Bilingual	54	85	82·20	88·42
Monoglot	100	101	93·33	88·07
Difference (in favour of Monoglots)		16	11·13	−0·35

The bilingual children have a slightly higher median I.Q. in the P test (non-language), but when the whole range is taken into consideration, the two groups appear approximately equal. In the previous investigation there was only a very slight difference between the two groups on this test—it was in favour of the bilinguals.

On the verbal tests (S and N) the bilingual children are distinctly inferior to the monoglots. Although their median I.Q. in the S Test is a little higher than their median in the N Test, their inferiority to the monoglots is more marked in the S Test, which they took in Welsh. Hence it may be inferred that their actual achievement in their Welsh Mental Test is lower than in their English Mental Test. Saer,[1] on the other hand, found that the Aberystwyth bilinguals whom he tested in both languages scored relatively higher when the Mental Test was given in Welsh. This fact does not necessarily conflict with our findings, since Saer used Binet Tests which are given orally, and in this investigation written tests were used. There may be a great difference between a person's colloquial knowledge of a language and his ability to read it with comprehension.

(*c*) *Vocabulary tests.*

Let us now inspect the results of the vocabulary tests in order to see in which language the groups appeared stronger.

TABLE IV.

VOCABULARY TESTS. MEDIAN SCORES AND QUARTILES (max. 75).

Schools.	*No.*	*Vocabulary A (Welsh).*		*Vocabulary B (English).*	
		Median Scores.	*Inter-quartile Range.*	*Median Scores.*	*Inter-quartile Range.*
Bilingual ...... (A and B)	53	22	15–26·5	26	21–33
Combined ..... (C and D)	47	17	12–24	31	23–37
Bilingual Group (C and D)	26	22·5	18–27	29	22–38
Monoglot Group (C and D)	21	13	7·5–15	32	26·5–36
Monoglot ..... (E and F)	99	—	—	32	25–38

TABLE V.

COMPARISON OF MEDIAN SCORES IN WELSH AND ENGLISH VOCABULARY TESTS.

Schools.	*Bilingual A and B* (53)	*Combined.* *Bilingual Group C and D* (26)	*Combined.* *Monoglot Group C and D* (21)	*Monoglot E and F* (99)
Voc. B (English) Median Score	26	29	32	32
Voc. A (Welsh) Median Score	22	22·5	13	—
Difference in favour of English Vocabulary................	4	6·5	19	—

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[1] Op. cit., p. 26 and *J. of Exp. Ped.*, Vol. VI (1922), pp. 266, 267.

It appears that the English vocabulary of the bilingual schools is somewhat superior to their Welsh vocabulary, while this superiority is more marked in the case of the bilingual group in the ' combined ' schools. It is interesting to note, however, that the median for the Welsh vocabulary of the latter is as high as (in fact a shade higher than) that of the bilingual schools. The vocabulary of the English-speaking monoglot school is distinctly superior to the English vocabulary of the bilingual school as might be expected. Thus the monoglots have a greater range of vocabulary than the bilinguals have in either of their languages, which was also found to be the case in Saer's investigations.[1]

(*d*) *Correlations.*

TABLE VI,

CORRELATIONS OF SCORES ON MENTAL TESTS WITH SCORES ON VOCABULARY TESTS, AND INTER-CORRELATIONS OF MENTAL TESTS.

(The coefficient is obtained by the method of rank-differences.)

Tests.	*Bilingual Schools A and B.*		*Monoglot Schools E and F.*	
	No.	*Coefficient of Correlation*	*No.*	*Coefficient of Correlation*
Northumberland and Scottish..........	54	·826	100	·860
Northumberland and (non-language) Pintner	54	·753	100	·614
Scottish and (non-language) Pintner....	54	·697	100	·626
Northumberland and Voc. B (English)..	53	·795	99	·773
Scottish and ,, ,, ..	53	·729	99	·783
Scottish and Voc. A (Welsh) ..	54	·794	—	—
Northumberland and ,, ,, ..	54	·830	—	—
Voc. A (Welsh) and Voc. B (English) ..	53	·726	—	—
Pintner (non-language) and Voc. B	53	·619	99	·576
Pintner (non-language) and Voc. A	54	·640	—	—

In each case the coefficient is more than five times the probable error.

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[1] Op. cit., p. 30.

The correlation of the two verbal Mental Tests (N and S) is good, and they both correlate moderately with the non-language Mental Test (P). The correlation of the Vocabulary Test with the verbal Mental Tests (N and S) is only a little less than the intercorrelation of these two, indicating that language is an important factor in a verbal mental test, which is in agreement with the usual finding that a vocabulary test in itself can afford a very fair indication of intelligence. In the case of the bilinguals it may be noted that the correlation of the Welsh Vocabulary with the Welsh Mental Test is very similar to the correlation of their English Vocabulary with their English Mental Test, which suggests that the vocabulary factor counted almost equally in their two mental tests.

(*e*) *Comparison of scores in vocabulary and mental tests.*

TABLE VI.

Schools.	*Median Scores.*					
	No.	*Voc. A (Welsh).*	*Scottish Test (Welsh).*	*Voc. B (English)*	*Northumberland Test (English)*	*Pintner Test (non-language)*
Bilingual (A and B)	53	22	21	26	127·5	229
'Combined'—						
Bilingual Group (C and D)	26	22·5	13	29	131·25	242
Monoglot Group (C and D)	21	13	6	32	154	238
Monoglot (E and F)	99	—	—	32	163	228

TABLE VII.

(*a*) SCOTTISH MENTAL TEST (WELSH): PERCENTAGE FREQUENCIES OF SCORES.

No.	*Schools.*	0–9	10–19	20–29	30–39	40–49
54	Bilingual (A and B)	24·1	26·0	16·7	22·2	11·0
26	Bilingual Group (C and D)	38·5	26·9	26·9	3·85	3·85

(*b*) VOCABULARY A (WELSH): PERCENTAGE FREQUENCIES OF SCORES.

No.	*Schools.*	0–9	10–19	20–29	30–39	40–49
54	Bilingual (A and B)	11·1	31·5	37·1	16·6	3·7
26	Bilingual Group (C and D)	3·8	26·9	50·1	19·2	—

TABLE VIII.

(*a*) NORTHUMBERLAND MENTAL TEST (ENGLISH): PERCENTAGE FREQUENCIES OF SCORES.

No.	*Schools.*	25–74	75–124	125–174	175–224	225–274	275–325
99	Monoglot (E and F)	12·1	16·2	28·3	28·3	13·1	2·0
21	Monoglot Group (C and D)	4·8	14·3	47·6	23·8	9·5	—

(*b*) VOCABULARY B (ENGLISH): PERCENTAGE FREQUENCIES OF SCORES.

No.	*Schools.*	0–11	12–23	24–35	36–47	48–59	60–72
99	Monoglot (E and F)	4·0	15·2	48·5	25·3	6·0	1·0
21	Monoglot Group (C and D)	—	19·0	57·2	19·0	4·8	—

If the medians of the Welsh Vocabulary Test are compared with those of the Welsh Mental Test, and the medians of the English Vocabulary Test with those of the English Mental Test, it is seen that the tendency is for a higher vocabulary median to be associated with a higher mental test median. This, however, is not the case in the bilingual and monoglot groups of the 'combined' schools (C and D). As regards the monoglots (see Table VIII) the scores of Group E and F are more widely scattered than those of Group C and D in both tests, otherwise the difference between the groups is not very marked in either test. But the bilingual Group C and D, though slightly superior to A and B in the Welsh Vocabulary Test (see Table VII), is distinctly inferior in the Welsh Mental Test; it appears however slightly superior to A and B in the other two mental tests (see Table VI). Hence it may be suggested that while these bilingual children in the 'combined' schools have gained proficiency in English through association with English-speaking children, their proficiency in Welsh (in spite of their Welsh vocabulary) has suffered.

Thus it appears that other factors connected with language, apart from range of vocabulary, condition success even in this mental test, in which neither powers of composition nor ability to construct sentences are involved.

CONCLUSIONS.

(1) This investigation confirms the results of the previous investigation as follows:

(i) The difference between the bilingual and monoglot groups, when measured by a mental test in which no language is used, is insignificant.

(ii) The bilinguals are distinctly inferior to the monoglots when measured by a mental test given in their second language.

(2) When the two groups are measured by a mental test given to each in its mother-tongue, the superiority of the monoglot group is even more marked.

(3) The inference is that these bilingual children, aged 10½–11½ years, and drawn from two adjacent schools in a mining district, are unable to do justice to themselves in either language.

(4) Success in a verbal mental test appears to be conditioned in a great degree by extent of vocabulary.

(5) The bilinguals, neither in their mother-tongue nor in their second language, appear to have a vocabulary equal to that of the monoglots.

(6) This inferiority of vocabulary when taken in conjunction with the equality of bilinguals and monoglots in a non-verbal mental test, probably accounts in large measure for their inferiority to the monoglots in the two verbal mental tests.

(7) There is some evidence that, apart from range of vocabulary and powers of composition, there are other factors connected with language which affect success in a verbal mental test.

Thanks are tendered to Professor William Phillips for his help in the translation and adaptation of the two tests for the Welsh-speaking children, to the Director of Education and Head Teachers who afforded facilities for the testing of their pupils, also to the teachers and student who rendered assistance when the tests were given, and finally to Professor Olive Wheeler and Dr. George Seth for their helpful criticism.

RÉSUMÉ.

UNE AUTRE ÉTUDE DE L'INTELLIGENCE RELATIVE DES ENFANTS DANS CERTAINES ÉCOLES À DEUX LANGUES, ET À UNE LANGUE AU SUD DU PAYS DE GALLES.

On établit une comparaison des résultats relatifs des enfants bilingues et des monoglottes, habitant des régions à l'industrie minière, dans deux tests verbaux et un sans langage, et aussi dans des tests de vocabulaire. Un des tests d'intelligence et un de vocabulaire furent appliqués en gallois aux enfants bilingues.

Dans le test sans langage les deux groupes se montrèrent à peu près égaux ; dans les autres tests les enfants bilingues étaient inférieurs aux monoglottes et il semblait que leur infériorité fût due, jusqu'à un certain degré, aux limitations de leur vocabulaire dans toutes les deux langues.

Un groupe bilingue, tiré de deux écoles ayant une population mixte, parlant anglais et gallois, bien que légèrement supérieur aux autres dans le test de vocabulaire gallois (et dans le test anglais et les tests sans langage) était nettement inférieur dans le test en gallois. Ce fait suggère que certains facteurs, autre que le vocabulaire, mais ayant quelque rapport avec le langage, déterminèrent leur accomplissement dans ce test d'intelligence.

ZUSAMMENFASSUNG.

EINE WEITERE UNTERSUCHUNG DER VERGLEICHENDEN INTELLIGENZ VON KINDERN AN GEWISSEN ZWEISPRACHIGEN UND EINSPRACHIGEN SCHULEN IN SÜDWALES.

Es wird ein Vergleich angestellt zwischen den korrespondierenden Leistungen von zweisprachigen und einsprachigen Kindern aus zwei Bergwerksgebieten mit zwei Wort-und einem Nicht-Wort-Intelligenztest und auch mit Wortschatztests ; den Zweisprachigen wurden in wallischer Sprache ein Intelligenz-und ein Wortschatztest gegeben.

Beim Test ohne Sprache zeigten sich die beiden Gruppen als annähernd gleichstehend, bei den anderen Tests standen die Zweisprachigen tiefer als die Einsprachigen, und es ergab sich, dass ihre Unterlegenheit bei den Wortintelligenztests in gewissem Grade von den Beschränkungen ihres Wortschatzes in beiden Sprachen herrühte.

Eine zweisprachige Gruppe, die aus zwei Schulen mit einer gemischten englisch- und wallisischsprechenden Bevölkerung genommen wurde, war entschieden tieferstehend in der wallisischen Intelligenzprüfung, obgleich sie den anderen zweisprachigen im wallisischen Wortschatztest (und im Test in englischer Sprache und in den Intelligenzprüfungen ohne Sprache) etwas überlegen war. Dies weist darauf hin, dass vom Wortschatz unabhängige, aber mit der Sprache verbundene Faktoren ihre Leistung in dieser Intelligenzprüfung bedingten.

A BRIEF SURVEY OF NEARLY ONE THOUSAND JUVENILE DELINQUENTS.[1]

BY W. L. CHINN.

(*From the Department of Education, University of Birmingham.*)

I.—*Introductory.* II.—*Types of offences.* III.—*Home conditions.* IV.—*Social agencies and other factors.* V.—*Conclusions.*

I.

A SURVEY of Birmingham Juvenile Court cases was undertaken in 1932, in view of the desirability of a detailed study of certain aspects of juvenile delinquency. At that time attention was being largely concentrated on the psychiatric study of the problem child. This aspect is undeniably of great importance, but there is also justification for regional studies of juvenile court cases on more general lines, especially if, as a result, certain broad measures of preventive treatment can be suggested. It is also worth recording that most previous surveys of this nature had been made in capital cities (e.g., by Dr. Burt in London), or in America, where specific factors may influence the incidence of delinquency. Birmingham is a homogeneous city. It is neither a port nor a capital, and its foreign element is very small. Class but not racial distinctions are apparent and even the class distinctions do not range so widely as in a capital city. Consequently certain environmental conditions do not arise. There are few homes where the father is compelled by reason of his employment to be an absentee, or few cases of emotional disturbance due to racial complications, or any undue rate of illegitimacy.

The basis of the survey was a study of 966 male juvenile delinquents who appeared before the City of Birmingham Juvenile Court charged with indictable offences. The survey covered a period prior to the passing of the Children and Young Persons Act, 1933, which raised the age of criminal responsibility to eight years. Hence the inclusion of children of seven years of age.

II.—TYPES OF OFFENCES.

So varied were the offences committed by children and young people that it was difficult to divide them into satisfactory categories. It was obvious, too, that broad groupings, even with numerous subdivisions, would not include all offences.

Theft was clearly the most commonly committed offence, and under the comprehensive heading of larceny were listed the eleven types of theft most frequently encountered. An analysis was then made of the ages at which the various types of offences were committed. Interesting variations between age groups were immediately apparent. For example, while the theft of money was numerically the most commonly committed theft, the number of such thefts was greatest in two age groups only—i.e., 10–11 years and 14–15 years. In the 7–9 year age group only 12·3 per cent of the delinquents stole money, in the 10–11 year group 21·2 per cent, in the 12–13 year group 16·8 per cent, and in the 14–15 year group 20·3 per cent. The most frequently occurring offences in each of the above age groups were as follows: 7–9 years, breaking and entering (23·4 per cent); 10–11 years, larceny of money (21·2 per cent); 12–13 years, larceny of food (22·7 per cent); 14–15 years, larceny of money (20·3 per cent). It was also significant to note the incidence of breaking and entering—that characteristic gang activity—which declined progressively with advancing years as follows: 23·4 per cent, 17·1 per cent, 13·9 per cent, 8·9 per cent.

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[1] Based on a Thesis approved for the degree of M.A. in Education, University of Birmingham, 1933.

TABLE I.

TYPES OF OFFENCES AMONG BOY DELINQUENTS.

Age.		*Larceny. Types of larceny, etc. See note below table.*											*Total Lar-ceny*	*L.*	*M.*	*N.*	*Total*
		A.	*B.*	*C.*	*D*	*E.*	*F.*	*G.*	*H.*	*I.*	*J.*	*K.*					
7–9..........	*No.*	4	1	2	10	5	12	—	13	7	4	4	62	19	—	—	81
	%	4·9	1·2	2·5	12·3	6·2	14·8	—	16·0	8·6	4·9	4·9	76·5	23·4	—	—	
10–11..........	*No.*	16	4	5	41	4	31	5	32	8	5	5	156	33	—	4	193
	%	8·3	2·1	2·6	21·2	2·1	16·1	2·6	16·6	4·1	2·6	2·6	80·8	17·1	—	2·1	
12–13..........	*No.*	14	8	4	54	13	73	10	56	19	12	7	270	45	5	2	322
	%	4·3	2·5	1·2	16·8	4·0	22·7	3·1	17·4	6·2	3·7	2·2	83·8	13·9	1·5	0·6	
14–15..........	*No.*	30	13	8	75	20	38	14	58	12	3	10	281	33	20	36	370
	%	8·1	3·5	2·2	20·3	5·4	10·3	3·8	15·7	3·2	0·8	2·6	75·9	8·9	5·4	9·7	
Total	*No.*	64	26	19	180	42	154	29	159	46	24	26	769	130	25	42	966
	%	6·5	2·6	1·9	18·6	4·3	15·6	3·0	16·4	4·9	2·5	2·6	79·6	13·4	2·6	4·3	

KEY.

A.—Larceny, cycles.
B.— do. cycle accessories.
C.— do. watches.
D.— do. money.
E.— do. cigarettes.
F.—Larceny, food.
G.— do. automatic machines.
H.— do. miscellaneous theft.
I.— do. toys.
J.— do. multiple stores.
K.—Larceny, clothing.
L.—Breaking and entering.
M.—Sex.
N.—Miscellaneous.

Sex offences, non-existent in the two lower age groups, increase from 1·5 per cent of the total in the 12–13 age group to 5·4 per cent in the 14–15 year group.

III.—Home conditions.

(a) Parent relationship.

The home conditions of the delinquents were studied from the point of view of any deviation from the normal father-mother relationship. For this purpose Dr. Burt's list of defective family relationships (The Young Delinquent, p. 64), which follows with a few modifications the classification used in the presentation of American Juvenile Court statistics, was adopted as it was found to provide the most exact record of deviation from the normal. The "break" in the home in these cases was, as it were, a physical condition in which one or both of the normal partners in a home had departed, to be replaced, in some instances, by an outsider. Moral considerations such as parental drunkenness or incompatibility of temperament were not investigated. 31·5 per cent of the delinquents came from "broken homes," 9·6 per cent from homes where the father was dead and was unreplaced by a step-father. This figure of 31·5 per cent was considerably lower than that indicated by Dr. Burt in his study of London delinquents, but was in close accordance with the figures published by the U.S. Department of Labor in 1930, which showed 34 per cent of 53,757 delinquents to have come from "broken homes." More offences were committed by boys from homes recreated with the help of a step-father than from those with a step-mother, a feature most noticeable in the 14–15 year group.

Table II.

Analysis of home conditions.

Age Groups.		*Broken Homes.*										
		Both Parents Dead.	*Father Dead.*	*Mother Dead.*	*Parents Separated.*	*Step-Father*	*Step-Mother*	*Illegitimate.*	*Living with Relations.*	*Total.*	*Normal Homes*	*Total.*
7–9	*No.*	—	7	6	4	6	3	2	2	30	51	81
	%	—	8·6	7·4	4·9	7·4	3·7	2·4	2·4	37·0	63·0	8·4
10–11 . .	*No.*	—	18	10	5	7	6	1	1	48	145	193
	%	—	9·3	5·1	2·5	3·6	3·1	0·5	0·5	25·0	75·0	20·0
12–13 . .	*No.*	7	27	16	12	14	14	4	3	97	225	322
	%	2·1	8·3	4·9	3·7	4·3	4·3	1·2	0·9	30·0	70·0	33·3
14–15 . .	*No.*	3	42	16	16	29	12	5	7	130	240	370
	%	0·8	11·4	4·3	4·3	7·8	3·2	1·3	1·9	35·0	65·0	38·3
Totals . .	*No.*	10	94	48	37	56	35	12	13	305	661	966
	%	1·0	9·6	4·9	3·8	5·7	3·6	1·2	1·3	31·5	68·5	100·0

(*b*) *Chronological position of delinquent in the family.*

In order to determine the chronological position of the delinquent in the family a preliminary analysis was made of the number of children in the families from which the delinquents came. For this purpose 1,000 families, included in which were the 966 previously reviewed, were examined. In each family one or more of the children were delinquent and only cases where the relevant information was in doubt were omitted.

TABLE III.

TOTAL NUMBER OF CHILDREN IN FAMILY.

Age.		*Only Child.* 1	2	3	4	5	6	7	8	9	10	*More than* 10	*Total.*
7–9 ..	*No.*	5	9	7	20	17	15	9	7	8	1	1	99
	%	5·1	9·1	7·1	20	17·1	15·1	9·1	7·1	8·1	1·1	1·1	
10–11 ..	*No.*	3	11	28	39	47	33	28	17	7	2	1	216
	%	1·4	5	13	18	21·8	15·3	13	7·9	3·2	·9	·5	
12–13 ..	*No.*	11	26	43	47	56	52	34	27	21	1	2	320
	%	3·4	8·1	13·4	14·7	17·5	16·2	10·6	8·4	6·6	·3	·6	
14–15 ..	*No.*	16	26	60	57	63	55	34	25	8	4	5	353
	%	4·5	7·4	17	16·1	17·8	15·6	9·6	7·1	2·3	1·1	1·4	
Total ..	*No.*	35	72	138	163	183	155	105	76	44	8	9	988
	%	3·5	7·3	14	16·5	18·5	15·7	10·6	7·7	4·4	·8	·9	

In each age group most delinquents came from homes where there were five or more children (i.e., four or more children other than the delinquent). The percentages from such homes were as follows: 7–9 years, 58·7 10–11 years, 62·6; 12–13 years, 60·3; 14–15 years, 55·8. Taking all age groups together the highest percentage of delinquents came from homes where there were five children (18·5 per cent).

TABLE IV.

POSITION OF DELINQUENTS IN FAMILY.

Age Group	*Eldest.*	*Youngest.*	*2nd.*	*3rd.*	*4th.*	*5th.*	*6th.*	*7th.*	*8th.*	*9th.*	*One set twins.*	*Only Child.*	*Totals.*
7–9	15	16	15	14	11	11	5	3	2	—	—	5	97
10–11	33	25	52	43	32	13	8	4	1	1	—	3	215
12–13	57	51	63	61	35	21	10	6	2	—	1	10	317
14–15	67	63	71	57	33	24	7	2	1	—	1	16	342
Totals	172	155	201	175	111	69	30	15	6	1	2	34	971
%	17·7	15·9	20·7	18·0	11·4	7·1	3·1	1·5	·6	·1	·2	3·5	

The greatest number of delinquents were second children (20·7 per cent). Next came third children (18 per cent), followed by the eldest (17·7 per cent) and the youngest (15·9 per cent).

IV.—SOCIAL AGENCIES AND OTHER FACTORS.

The survey approached the problem of extra-home factors from the point of view of other socialising influences with which children come in contact. It was found that twice as many non-delinquents as delinquents belonged to voluntary social organisations, such as the Boy Scout Movement, The Boys' Brigade, Boys' Clubs, etc. For the purposes of comparison an equal number of non-delinquents were studied. Interesting facts indicating the popularity of the various organisations amongst delinquents were apparent. Details are given in Table V.

TABLE V.

COMPARISON BETWEEN DELINQUENTS AND NON-DELINQUENTS IN RESPECT OF MEMBERSHIP OF RECOGNISED SOCIAL ORGANISATIONS.

Age Group.		*Percentages in various organisations.*				
		None.	*Club.*	*Scouts.*	*Boys' Brigade.*	*Sunday School only.*
10–11....	Delinquents	58·6	4·5	8·2	·6	28·0
	Non-Delinquents	26·7	18·4	14·1	5	35·7
12–13....	Delinquents	61·9	3·7	3·7	7·4	22·8
	Non-Delinquents	39	8·7	11·1	7·2	33·9
14–15....	Delinquents	83	5	3·2	·9	6·4
	Non-Delinquents	45·6	9·2	8·3	7·5	29·4
% of Totals.	Delinquents	68·8	4·4	4·7	3·2	18·3
	Non-Delinquents	38·8	11·2	10·6	6·8	32·5

Bearing on the question of the employment of leisure the daily and monthly incidence of delinquency was investigated and a comparison was suggested with the London figures compiled by Dr. Burt and the late Sir William Clarke Hall. The daily figures are closely parallel—in each case the week-end peak was apparent with Sunday as the day on which most offences were committed—but the monthly figures indicated that in Birmingham most delinquencies were committed in March and January and fewest in August and May. The London figures showed maxima in June and December, minima in February and August. Details are given in Table VI.

TABLE VI.

DAILY INCIDENCE OF DELINQUENCY.

Age Group.		*Sat.*	*Sun.*	*Mon.*	*Tues.*	*Wed.*	*Thurs.*	*Fri.*
7–9	*No.*	17	20	14	11	4	7	8
	%	21·0	24·6	17·2	13·5	5·0	8·6	10·0
10–11	*No.*	48	45	26	26	16	17	15
	%	25·0	23·3	13·4	13·4	8·2	9·0	7·7
12–13	*No.*	76	89	34	28	35	33	27
	%	23·4	27·6	10·5	8·6	11·0	10·2	8·4
14–15	*No.*	72	97	35	35	38	42	51
	%	19·4	26·2	9·5	9·5	10·3	11·3	13·8
Total	*No.*	213	251	109	100	93	99	101
	%	22·0	26·0	11·3	10·3	9·6	10·2	10·5

There were considerable variations in the monthly incidence of delinquency between the age groups. The two youngest groups (7–11 years) not unexpectedly show September as the month of most delinquencies, and do not share in the January increase so noticeable in the 12–15 year groups. The actual figures are given in Table VII.

TABLE VII.

MONTHLY INCIDENCE OF DELINQUENCY

Age Group.		*Jan.*	*Feb.*	*Mar.*	*Apl.*	*May.*	*June.*	*July.*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*
7–9	*No.*	2	3	8	10	9	5	8	5	14	6	8	3
	%	2·5	3·7	9·9	12·3	11·1	6·1	9·9	6·1	17·4	7·4	9·9	3·7
10–11	*No.*	12	11	24	20	17	23	14	8	28	8	11	17
	%	6·2	5·7	12·4	10·4	8·8	11·8	7·2	4·1	14·5	4·1	5·7	8·8
12–13	*No.*	45	28	45	24	18	32	18	7	22	24	31	28
	%	13·9	8·7	13·9	7·4	5·5	9·9	5·5	2·1	6·8	7·4	9·6	8·7
14–15	*No.*	44	36	33	41	21	37	29	25	24	33	21	26
	%	11·8	9·7	8·6	11·1	5·7	10·0	7·8	6·7	6·5	8·6	5·7	7·0
Totals	*No.*	103	78	110	95	65	97	69	45	88	71	71	74
	%	10·7	8·0	11·4	9·8	6·7	10·0	7·1	4·5	9·1	7·3	7·3	7·7

V.—CONCLUSIONS.

It is suggested that there are two broad and interrelated groups into which delinquent acts may be classified. These may be termed the emotional delinquencies and the opportunistic. The former include the compensatory delinquencies which are the special province of the psychiatrist and the Child Guidance Clinic. The latter include the delinquencies which occur largely on account of unorganised leisure.

There is obviously no clear division between these groups except that, in treatment, emotionally stable delinquents will more readily respond to minor environmental adjustments.

No attempt was made to analyse the cases to discover the number of unstable children, but while many delinquents from so-called normal homes were undoubtedly ill-adjusted emotionally, it was significant that so many came from " broken homes." It appeared clear that even these cases presented in many instances a characteristic lack of outlet for primal urges.

The statistics provided in regard to the use of leisure and in regard to the daily and monthly incidence of delinquency indicated that the delinquents did not tend to utilise the socialising agencies subsidiary to the home and school to the same extent as non-delinquents and that there were times, both weekly and seasonally, when juvenile interests most needed canalisation.

In general, the survey suggested:

1.—That delinquent acts are committed most frequently either to satisfy immediate material needs or in response to unrecognised psychic forces developed on account of an environment ill-suited to the development of personality of the delinquent.

2.—That the socialising agencies of the home and the school were not sufficient alone to produce satisfactory adjustment in many instances. The free association of children in supervised organisations was thought to be often an essential factor in the development of personality.

3.—That the misuse of leisure was a contributory factor in many delinquencies, and that a considerable number of the offences were committed on account of the coincidence of leisure and opportunity.

4.—That the delinquent presents, in part, a problem in defective discipline, and that the defect is either produced or accentuated by incomplete family and social adjustments.

5.—That there is a great need for further study of delinquency with a view to preventive as well as remedial measures. The predispositions and environmental factors which tend to anti-social conduct need to be recognised early and treated intelligently. The co-operation of teachers and social workers, it is suggested, could, in many instances, prevent the circumstances occurring which give rise to actions which lead to the juvenile court.

RÉSUMÉ.

UN BREF EXAMEN DE PRÈS DE 1000 JEUNES DÉLINQUANTS.

L'article résume une étude de 966 jeunes délinquants entre les âges de sept et de quinze ans qui comparurent devant les magistrats de la cour d'enfants de la ville de Birmingham, accusés d'infractions de la loi du pays. L'on négligea les infractions des règlements locaux.

Pour l'examen, les délinquants furent divisés en quatre groupes d'âge, dont chacun comprenait deux ans. L'on analysa les infractions commises. Le vol était le plus commun d'entre elles. L'on classa par onze groupes les objets le plus frequemment volés.

L'on étudia les familles des délinquants et nota toute variation dans le rapport normal Père-Mère. L'on se renseigna sur la place chronologique de l'enfant dans sa famille, et sur le nombre d'enfants dans chaque famille.

Parmi d'autres facteurs examinés fut l'emploi du loisir, et l'on établit une comparaison entre deux groupes égaux de délinquants et de non-délinquants quant à leur participation aux organisations de jeunesse. De plus on étudia l'incidence quotidienne et mensuelle des infractions. L'on arriva à certaines conclusions tirées d'une étude des statistiques obtenues.

ZUSAMMENFASSUNG.

EIN KURZER ÜBERBLICK ÜBER UNGEFÄHR 1000 JUGENDLICHE VERBRECHER.

Dieser Artikel fasst eine Untersuchung von 966 männlichen, jugendlichen, Verbrechern im Alter von sieben bis fünfzehn Jahren zusammen, die im Jugendgericht der Stadt Birmingham wegen Verletzungen gegen das Landgesetz zu erscheinen hatten. Spezielle Lokalgesetze wurden nicht in Betracht gezogen.

Bei der Untersuchung wurden die Verbrecher in vier Altersgruppen eingeteilt, bei denen jede Gruppe zwei Jahre einschloss.

Die Verletzungen wurden analysiert. Diebstahl war das üblichste Vergehen und bei elf Gruppen wurden die häufigst gestohlenen Gegenstände aufgezählt.

Die Familienzustände der Verbrecher wurden untersucht und Abweichungen vom normalen Vater-Mutter-Verhältnis wurden aufgeführt. Die zeitliche Stellung des Verbrechers in der Familie und die Zahl der Kinder in jeder Familie wurden geprüft.

Unter anderen Faktoren, die man untersuchte, war die Benutzung der Freizeit von den Verbrechern und ein Vergleich wurde angestellt zwischen einer gleichen Zahl von Verbrechern und Nichtverbrechern mit Bezug auf Mitgliedschaft von Jugendorganisationen. Ferner wurde das tägliche und monatliche Vorkommen von verbrecherischen Tendenzen untersucht.

Gewisse Schlüsse wurden aus dieser statistischen Untersuchung gezogen.

OUTLINES OF RESEARCHES REPORTED IN THESES ACCEPTED FOR HIGHER DEGREES.

An Examination of the Manner in which Prose Passages are Memorised by Pupils between the ages of 10 and 13.

By C. D. WOSTENHOLM.

This thesis was accepted for the degree of M.Sc. in Education of the University of Sheffield in 1936; a copy of the thesis is deposited in the University Library.

THREE groups of tests were devised, the first to estimate the intelligence of the pupils, the second their ability in semi-mechanical memorising, while the third consisted of a series of nine prose passages. The prose tests were standardised by comparing the scores, in a given test, of a group of 120 or more boys with their scores in one chosen as a standard. These tests were given consecutively in varying order to ten groups of boys in elementary schools. The subject matter of the first eight tests was geographical, but the topic of the ninth, which was always given at the end of the series, was astronomical. The conditions under which the tests were applied were varied; some groups recalled the information immediately after learning, while others reproduced it after an interval of three or four days. In some cases the learning and recalling were preceded by the playing of gramophone records.

It has been shown that the method of memorising prose passages changes during successive applications of the tests. The changes are of the nature of variations in the influence of intelligent and mechanical processes. These processes appear to be subconsciously integrated during habituation to the test conditions, and the integration is specific to the task. There is simultaneous group improvement in the level of attainment during the change in the method of memorising. The integration probably coincides with the plateau of the learning curve.

Lengthening the time interval between learning and recall makes the learning curve less subject to changes in the test conditions and delays the modifications in the method of memorising.

The music possibly facilitates the changes in the method of memorising but produces little effect on the actual scores.

A Comparison of the Prognostic Values for Secondary Education of Entrance Examination, Primary Teachers' Estimates and Scottish Mental Survey.

By CHARLES M. MORRISON.

Thesis approved for the Degree of Ed.B. at Glasgow University, 1937.

THIS paper contains the results of an investigation into the predictive value of certain tests and estimates made during the primary school life of children with reference to subsequent success in the first three years of the secondary school. The entrance test (qualifying examination) is not a satisfactory prognostic; its correlation with secondary school success is less than ·5; it gives a wrong pass-or-fail prediction for more than a quarter of the pupils. Estimate marks from primary schools, although made by eighteen different schools, proved to be at least as trustworthy a prognostic as the entrance examination. The total marks gave a correlation with secondary school success of nearly ·6; the proportion of pupils wrongly estimated at pass-or-fail level being about one in four. Intelligence test results (available for some only of the pupils) gave a correlation of ·5 with secondary school success; the proportion of pupils wrongly estimated at pass-or-fail level being almost one in three. None of these is a satisfactory guide in selecting pupils. The marks obtained by a pupil in the first form is the most satisfactory guide to his future success in the secondary school. The correlation approaches ·8; only one pupil in seven is misjudged at pass-or-fail standard.

An Investigation of Spelling for the purpose of finding a Method of Teaching in Primary Schools.

By FREDERICK J. MACMILLAN.

Thesis approved for the Degree of Ed.B. at Glasgow University, 1937.

A METHOD of teaching spelling was devised in which each pupil in the class said in turn one letter of the word that was being spelled. This method was suggested mainly by the Gestalt theory of the function of stress in remembering. A subsidiary advantage was its encouragement of the play attitude in the pupils. A group of forty-six pupils taught by this method was compared with an equivalent control group taught by the ordinary school methods. The pupils taught by the new method showed a marked superiority in their score in a spelling test at the end of their course. The difference between the scores was 21·5 with standard error 3·5.

A Comparative Study of the Self-teaching and Expository Methods in Day School Religious Instruction.

By JOHN A. McPHERSON.

Thesis approved for the Degree of Ed.B. at Glasgow University, 1937.

A SELF-TEACHING method (modelled on the Dalton plan) was devised covering the life of David. This was used with a class of girls. A control group of similar age, social status and intelligence level were taught the same period by the usual " expository " method. Both groups were tested at the end of the course by identical tests of two kinds, the one testing knowledge of facts and the other the assimilation of religious and moral ideas. On the " facts " test, there was no significant difference between the groups taught by the two methods, but the " ideas " test showed a significant superiority in the group taught by the " self-teaching " method (P= ·05). Both results were confirmed by an [illegible] (single) group of boys taught by both methods. A large majority of the children were found to prefer the self-teaching method.

An Investigation of the Relationship between Rate and Quality of Handwriting in the Primary School.

By ANNIE R. WILLS.

Thesis approved for the Degree of Ed.B. at Glasgow University, 1937.

CHILDREN of different age groups ranging from eight to twelve were told to write a standard sentence. They were instructed to write as they usually did, but to do as well as they could (in quality and speed). One hundred and seventy-two subjects were used in all. The writings were marked both for quality and speed. For all years there was found to be a positive correlation between quality and speed, ranging from ·40 to ·68. Mean speed was found to increase with age up to eleven years, after which there was a light decrease. Improvement in quality was slow and ceased at age ten.

The Form Perception Factor : a Study of a variety of Form-relations Tests and of the existence of a Factor of Form Perception and of its relation to School Subjects.

By IAN SMITH.

Thesis approved for the Degree of Ed.B. at Glasgow University, 1937.

A VARIETY of types of form perception tests were constructed and applied to first and second year pupils in a secondary school. Tetrad differences were calculated for the intercorrelations of these tests together with two intelligence tests. Some of these tetrads were significantly larger than they would have been if they had been normally distributed about zero. This showed the presence of a group factor as was found by Koussi. The group factor was found in those tests in which it has been stated to occur by Koussi. It is in such tests as require the ability to form and retain an exact impression of shapes or patterns. This ability may depend upon the possession of good visual imagery. The battery of form-relations tests showed a significant sex difference, boys showing a higher score. Significant correlations were found between the form-relations score and school ability in art, practical geometry, and engineering drawing (intelligence constant). No correlation was found with handwork. The above results suggest that the ability measured by the test might be useful in certain occupations, and that an improved form of the test might be used for diagnosing the abilities required for these occupations and for such school subjects as art, engineering drawing and gemoetry.

An Investigation into the Problem of Forgetting of Different Kinds of Material by School Children.

By G. AHMAD.

A Thesis approved for the Degree of M.Ed. of the University of Leeds in 1936.

TESTING materials were of four kinds : printed stories, pictures, gramophone records, and the cinema.

The testing was immediate, after one month, after two months, and even after three months, in some cases.

1.—Stories such as " Roxana the Mare," " Yankee Clipper Ships," " The Fairy Blackstick," and a " Letter from Arthur to his Grandmother," which could be regarded as adventurous, humorous, imaginative, or abstract, were read by school children. An interrogatory was prepared for each story.

2.—A picture was exhibited for a definite time. " The Australians " was used in the first test, and a more complicated picture, " St. George," in the second.

3.—Two well-known gramophone records were employed : " Runcorn Ferry " and " Sam's Sturgeon."

4.—The cinema programme was typical of a children's Saturday afternoon programme :

(*a*) News : (i) Lord Mayor's Procession, (ii) Armistice Day ; (*b*) " Our Gang " in " Anniversary Trouble " ; (*c*) " Mickey Mouse," " The Mad Dog " ; (*d*) " Shadow of the Eagle " ; (*e*) " Strike it Rich."

Five classes were selected for the testing and the I.Q. of each pupil was obtained by the use of Tomlinson's " West Riding " tests.

Name.		*Class.*	*No. of Pupils.*	*Average Age.*	*Average M.A.*	*Average I.Q.*
Leeds :	School A	J5, Boys	31	10·10	11·10	109
	School A	J4B, Boys	32	10· 5	9· 5	90
Bradford :	School B	J4, Mixed	29	10· 7	10· 4	98
	School C	J4, Mixed	29	11· 0	9· 8	87
	School D	J4, Mixed	40	10· 7	11· 9	111

In this study, forgetting differs from obliviscence just as improvement in remembering after an interval of time differs from reminiscence proper. What generally happens is that a child loses one or more items which he had given in the immediate test, and remembers one or more items which were not mentioned in the immediate test. Thus the amount of forgetting does not measure the amount of obliviscence, neither does the amount of improvement measure the amount of reminiscence. The balance of the immediate and deferred test scores, or of obliviscence and reminiscence is called forgetting.

SUMMARY OF RESULTS.

1.—The correlation between intelligence scores and immediate memory scores is always positive and yields an average of 0·51.

2.—The immediate memory for printed stories correlated highest with intelligence, that for gramophone records came next, then that for pictures, and, lastly, that for the cinema.

3.—Both immediate and delayed memory scores correlated appreciably with intelligence scores, and there is no conclusive evidence from this study which of the two is the higher.

4.—The correlation between intelligence and obliviscence is negative for an interval of one month. For the longer intervals the evidence is not decisive.

5.—The correlation between intelligence and reminiscence is negative but generally low for an interval of one month. For the longer intervals no definite conclusion could be drawn.

6.—The correlation between intelligence and forgetting in this study is generally negative but rather insignificant. Possible this may be accounted for by the fact that quite a number of the questions in the interrogatories seemed to depend on retentivity rather than on the eduction of relations.

7.—The amount of forgetting manifested depends upon the kind of material employed. It is highest for printed stories and lowest for the cinema and for pictures.

8.—The interposition of an immediate learning test affects the amount of subsequent forgetting.

9.—Children exhibit reminiscence with every kind of material, even after so long an interval as one month or two months.

10.—It is not certain what kind of material is most liable to produce reminiscence, but the results of this study seem to point to the cinema and to pictures.

11.—Certain types of omissions such as titles, proper names, numbers, and colours were specially noticeable in the answers.

12.—The children's answers contained statements which were their own importations, and the process of rationalisation seems to be at work when children are asked to recall their experiences.

Heads of Departments forwarding Reports of Researches are asked to see that they contain as far as possible exact statements of facts, actual correlations, numbers of persons studied, methods used, etc., and are not general descriptions of the theses. Such an outline of main results need not necessarily occupy more space than would less definite accounts.

THE BACKWARD CHILD.

By CYRIL BURT. (University of London Press, pp. 694. 20s. net.)

It may be said at once with confidence that this volume is likely to be the standard work on the backward child for a long time in this country. It is packed with good material and set forth with that clarity and exactness which we expect from Professor Burt. All aspects of the problem of backwardness are dealt with here, both scientifically and sympathetically. As Professor Burt says in his preface, he has tried to be at once "scientific and practical" and in this aim he has been most successful. Detailed and exact evidence is given for every generalisation. One meets nowadays with so many books in which the writer is content with dogmatic statements about "every child" or "most parents," supported by few or no relevant facts, that it is indeed refreshing to deal with a work in which sound evidence abounds.

Professor Burt's method was first to make a wide survey of the distribution of backward children in the electoral divisions of London, using as material the half-yearly preliminary examination held for all children in the elementary schools between the ages of 10¼ and 10¾, who were in or above Standard IV.

This was supplemented by a special testing of certain representative types of classes. From material of this general, but widespread, enquiry Burt draws up his first main table (page 100), which reveals various correlations between backwardness and such social phenomena as (*a*) percentage below the poverty line, (*b*) unemployment, (*c*) overcrowding, (*d*) size of family, and birth-rate, (*e*) death-rate. From these we find that backwardness and poverty go largely hand in hand. The correlation with overcrowding is 0·89, with juvenile delinquency 0·69, with the birth-rate 0·62, so Burt concludes that the areas where the dull are most numerous are the areas where the population is multiplying most rapidly.

These are supplemented by figures obtained from the special study of groups of normal and backward children, in which there was found a correlation between intelligence and the size of the family of –0·19. Elsewhere we find that the "average number of children in families containing at least one backward child is 4·6; in families containing at least one scholarship winner it is 3·3."

This broad survey was only the introduction to a much more detailed study. Burt selected 400 consecutive cases of backwardness, 200 being boys and 200 girls. Many kinds of facts were obtained about all these pupils: by standardised tests, by tests of physical condition, by reports on home circumstances and family history, reports on school progress, temperamental characteristics and so forth. A similar group of normal children was studied on the same lines, an essential supplement, of course, for any sound inferences to be made. Burt most rightly points out the inadequacy of investigations in which statistics about the abnormal children are given without precisely parallel figures for normal or control groups. In this control group there was corresponding to each backward child, a child of normal standards in educational attainment, and of the same age and sex, and attending the same school. These were picked from children who were described as of average attainment, the specially bright and the specially dull being first eliminated by the teacher. A somewhat similar group of about 200 was studied in Birmingham. It should be added that Burt takes as his definition of the backward child " all those who *in the middle of their school career* would be unable to do the work of the class next below that which is normal for their age " (p. 77).

The author now proceeds to compare the figures for the backward and the normal group in respect to the various possible causes and conditions already mentioned; and in addition such topics as sensory defects, motor defects, left-handedness, defects of speech, are all treated in a thorough and illuminating manner.

Perhaps the main fact which emerges is that backwardness is almost invariably the result of *several* causes, rarely of one. The eugenist, however, as well as the psychologist, will probably be most impressed by the finding that in some 60 to 70 per cent of the backward cases studied the general intelligence was decidedly below normal: to quote Burt's own words, " the general disability is inborn, the backwardness is irremediable" (Preface, p. 6).

Innate specific mental disabilities seem to be the main cause of backwardness in about one-sixth of the cases. In at least 10 per cent of the children examined there seemed to be no other contributory factor of appreciable significance, except lack of general innate capacity; and it must be remembered that these figures refer to a group of children from which were excluded actual mental defectives, that is children with an intelligence quotient of less than 70. Again there is material for the eugenist in the figures, which show that in 73 per cent of the backward cases an immediate relative was reported to be apparently dull (p. 446), as compared with only 21 per cent among the normal. Follow-up studies showed that these children in whom backwardness was due largely to *innate* disabilities were almost invariably unsuccessful in after life, very few doing satisfactorily in anything other than unskilled work. They contrasted sharply with those children who though backward at school were not innately dull, their backwardness being due to some other cause. These latter in their various trades and occupations, when judged by salary and degree of responsibility, were little if at all inferior to children from the same social class who were not backward at school (p. 455).

Let us turn now to other apparent causes of backwardness—environmental, temperamental, and so forth. On the average Burt found that the backward child suffered from at least three adverse factors (p. 564). Three-quarters of them suffer from unfavourable physical conditions, two-thirds from unfavourable social conditions, and one-third from unfavourable temperamental conditions. Only one-sixth seem to suffer from unfavourable school conditions. Here irregular attendance affords a correlation of 0·45 (London), 0·58 (Birmingham), with educational attainments. Specific defects such as poor hearing and impediment in speech give a correlation of 0·4. Extreme poverty only 0·25. Burt is cautious enough, however, to point out that " the mere fact that a certain condition is correlated with backwardness does not prove that the condition was an effective cause." " Indeed, a condition that is exceedingly rare, even in the backward, may nevertheless show a high correlation with backwardness because it is almost non-existent in the normal " (p. 569). Hence Burt's own conclusions are based not upon the plain correlation, but also upon a careful study of detailed relationship revealed in his enquiry.

We have little space to deal with the important practical conclusions arising from this enquiry. Burt puts as the first and most important step segregation in separate classes or schools. A child struggling (especially when he once gets behind) to keep up with others of greater ability, must struggle in vain, and probably only increases his feeling of inferiority. Against the segregation in separate schools, however, is to be put the much more marked feeling of being labelled as inferior. Personally then I should hope that segregation of this kind would be in classes in the same school. Burt goes on to suggest a re-classification of special subjects and individual treatment for children who have got further behind than their standard of innate ability would account for.

Even a lengthy review cannot give an adequate idea of the amount of information in this book on almost every aspect of the subject : but a few more special points may be cited. There is exposed the fallacy of the popular idea that the child who is backward educationally usually makes up for it by being " clever with his hands." The backward child tends to be backward also in writing, drawing and handwork generally (p. 268).

A word of special praise must be given for the thoroughness with which the author has analysed into elementary functions what are too frequently lumped together under vague and general terms. Some writers who have largely occupied themselves with the social psychology of youth, and especially the study of temperament and character, fall readily into some of the fallacies of the old faculty psychology and spoil their work through lack of thorough analysis. The separate treatment of elementary mental processes, such as Burt gives in abundance, is, it seems to me, essential if we are to discover at a sufficiently early age, defects which prevent normal progress in one or two important school studies, and so set up a more serious and general state of backwardness.

Scarcely less important than his psychological work is Burt's illuminating discussion of physical causes. One interesting point is that though mental development may be little affected by prolonged disease, attention to the need of more sleep proved in one experiment to have a more beneficial effect on poor arithmetical work than did extra coaching.

Temperamental and neurotic conditions of course are more frequently found among the backward than among the control normal child—but the difference is surprisingly small. For major defects it is only about twice as frequent, the correlation with backwardness varying from only 0·16 to 0·26 (for neurasthenia) : while for minor neurotic symptoms the relative percentage frequencies are very similar—backward 18·2, control 14·8 (Table, p. 542).

This chapter on Defects of Temperament and Character by the way is an excellent one for the general subject of temperament, apart from its value for the study of the backward child. Even more does the long chapter on Left-handedness—nearly 100 pages—constitute a compact and masterly monograph on the subject, worthy of printing separately, with very little modification. The same applies to the long chapter on Defects of Speech. My only fear is lest the very fullness of the book, necessitating such a size and price, will prevent it from being read as widely as it should be. Perhaps Professor Burt will find time soon to write a brief introduction to the subject with references to his own book for full details. For the gist of this work ought to be mastered by every teacher, to whom the following paragraph is a challenge :

> "Within the school itself the chief factor proves to be, not so much inefficient teaching, but what may be broadly described as inadequate organisation—lack of a systematic method for detecting the potentially backward at a sufficiently early age, failure to adapt

the teaching methods to the peculiar needs of each child, ill-timed promotion, ill-timed change of method or curriculum following removal from one class, one school, or one department to another, and finally (a factor which differs considerably in different areas) irregular attendance."

Far more frequently, however, Burt goes on to say, " the essential causes lie wholly beyond the school walls, so that the problem of the backward child is as much a social as an educational issue."

Rarely, I think, has a volume on educational psychology combined such a masterly treatment of detail with such philosophic breadth and practical suggestiveness.

C. W. VALENTINE.

PRINCIPLES OF CLASS TEACHING.

By FRANK SMITH and A. S. HARRISON. (Macmillan and Co., 1937, pp. x+384. 7s. 6d.)

The leaves of text-books are notoriously deciduous. Text-books on education are no exception. Professor J. J. Findlay's book, *Principles of Class Teaching*, which seemed so fresh and original when it first appeared in 1902, has now become outmoded through the swift march of events; and this present book is intended to take its place. Yet it cannot be considered a revised edition of the old book; it is in a strict sense a new book. The authors, with a loyalty all too rare, have duly acknowledged the debt they owe to the inspiration received from their mentor Professor Findlay; but what they have borrowed from his book is the spirit and the title. The bulk of the subject matter is so new that the work may justly be regarded as a fresh contribution to the theory and practice of teaching. And a very valuable contribution it is; not, in my opinion, of equal merit throughout, but taken as a whole a book to be procured and studied by all learners and practitioners of the difficult art of teaching. The authors are so manifestly conversant with the subject, are so acutely alive to the numerous problems and perplexities of the class teacher, that the reader's sympathy and confidence are secured throughout.

The first of the three parts into which the book is divided discusses the development of the pupil and the development of the school curriculum; it explains the Hadow reorganisation of elementary schools, and it has an interesting chapter on the corporate life of the school. It is well known that " marking time " took place under the old régime, and that it was one of the factors which gave rise to the inquiry by the Consultative Committee. I doubt, however, whether the explanation of " marking time " given by the authors is the true one. They state that the C stream of promotion, the slowest stream, in the non-selective central schools contains the children who marked time under the old system. And although the Report on the Education of the Adolescent lends colour to that view, my experience leads me to believe that the real marking time took place not with the C children but with the A children. The A children reached the highest class in the school long before they were fourteen and had to repeat year after year work which they had already mastered. It was repetition without progress. The older and duller children on the other hand never reached the top of the school. They had to repeat the work of their class, but it was necessary repetition.

It was repetition *with* progress. Whenever a careful investigation has been made into the relation between the abilities of children and their grading in the school it is found that the duller children are pushed forward faster than their abilities warrant, and the younger and brighter children are promoted more slowly than their abilities warrant. The dull child tugs along breathlessly at the tail of the procession, while the bright child having run ahead has to wait for the procession to catch up. With the dull it is forced marching ; with the bright, marking time.

Part Two of the book, which deals with the Curriculum, is largely based on the various reports of the Consultative Committee, reports which have now become so numerous and so bulky that it is well that they should be condensed and their most valuable recommendations presented in a convenient form. This is what Professor Smith and Mr. Harrison have done ; and they have done it well. The accounts given of the various types of school are necessarily brief, but more space might profitably have been allotted to the senior school ; by which I mean the school that has been creamed twice, once to recruit the secondary school and once to recruit the central school. The five pages which have been devoted to this school are not commensurate with its importance. For it contains about 80 per cent of the school population between the ages of eleven and fourteen. Perhaps after all the authors are wise in saying little about this type of school, for it is trying to solve experimentally its own problems ; and they are numerous enough, and tough enough in all conscience.

The most useful section of the book is Part Three, which deals with Principles of Method. Indeed I consider the first chapter in this section the best in the book. It deals with the initial problems of class teaching and is an admirable epitome of the best means of solving those problems. I can conceive no better *vade mecum* to the young teacher than this chapter.

Of the various branches of study separately dealt with in this section I regard English composition as receiving the least satisfactory treatment. The work carried out by Sir Philip Hartog on the writing of English is apparently unknown to the authors. Hartog's experiments and researches have shown how important it is to define the object and the audience when setting an exercise in composition, and how helpful are the criticism of the class and the final estimate of the writer of the composition concerning the value of his own effort in the light of that criticism. The authors seem to attach more importance to grammar than the experience of the past justifies. On pages 313-315 there appears a model lesson on the Adjective for children in a junior school. Of the five Herbartian

Steps which constitute the lesson the fourth ends with the sentence, "So we can say that adjectives are words that describe nouns." Here there is a confusion between words and things which does not augur well for the success of the teaching. Even the beginner (perhaps I should say especially the beginner) should realise that the parts of speech are words or symbols; that a noun is a mere name, as the term itself implies; and, as the term again implies, an adjective is a word that is merely added to it. In the phrase "the red hat" it is not the noun "hat" that is red, but the article of attire that is put on the head. Adjectives in fact describe things, not nouns. Trivial as this distinction may seem, it is in fact of vital importance in the teaching of grammar. The authors contend that grammar is distasteful to children because it is badly taught. I contend that it is distasteful because it is difficult—too difficult for immature minds. It is, in fact, a philosophic discipline, as difficult as logic and psychology. And my view is—a view which I have elsewhere expounded at tedious length—that it is as reasonable to teach children psychology in order to make them behave well, as it is to teach them grammar in order to make them speak well or write well.

Broad as is the outlook of the book, it is not broad enough to cover every aspect of the subject. Still it is not narrowly sectarian. Professor Findlay wrote the original book when he was still strongly under the influence of Professor Rein, and his book had confessedly an Herbartian bias; though this was considerably modified and balanced by Findlay's own contributions. This new book is quite as much Froebelian as Herbartian. It also recognises, though not so strongly as one could wish, the trend towards individual work imported by Dr. Montessori and Miss Helen Parkhouse. It is acknowledged quite early in the book that "the unit in education is not the school, or the class, but the single pupil"; but the implications of that statement are not fully explained or developed. This seems to arise from the fact that the authors almost entirely ignore the more scientific and delicate means of mental diagnosis and mental measurement which have been devised within the last three decades.

Just as in the departments of psychology in certain English and American universities there are two schools, the philosophic and the scientific, one of which concerns itself with discussing first principles, and the other with discovering facts and formulating laws, so are there in the realms of education in this country two distinct schools, which might, for convenience sake, be designated the Manchester school and the London school. The Manchester school emphasises the philosophic side of education and has no traffic of any kind with mental measurements. Mathematics is out of its orbit. The London school, on the other hand, whose leading exponents are Spearman and Burt, aims at making education as scientific as the nature of the material will permit. Means of discovering and estimating mental differences are to this school of fundamental importance. Without such means progress in the science is impossible, and educational theory becomes a mere " bombination in the void," and educational practice becomes enslaved to authority and tradition. The Scottish school, it may be added, is so closely allied to the London that the London Scottish, or the London and Scottish, would perhaps be a more appropriate designation.

The point I wish to make is that *both schools are necessary*. Each is incomplete without the other. And so long as it is recognised that any given book on education is in the main concerned with only one of these two aspects, no great harm is done. If, however, such a book claims to cover the whole ground one may legitimately raise a protest.

The book under review definitely (and indeed avowedly) belongs to the Manchester school ; and excellent as it is on its own ground it does scant justice to the other side. The word " intelligence " scarcely appears in the book at all. Binet's name occurs once, and that but casually, and no reference at all is made to the vast volume of recent research into the reliability and validity of testing. Examinations, it is true, are frequently mentioned, but mainly to point out their sinister influence on school studies. With these strictures I am wholly in accord. But there is a side to testing which is helpful rather than harmful. Indeed testing of some kind or other is an essential part of teaching. If teaching is causing to learn (and I don't know what else it can be) then the success of the teaching can only be gauged by the amount of learning that has taken place. And the amount of learning that has taken place can only be discovered by testing. To omit a discussion of testing, and of the attempts to make testing objective, is a serious defect in a book purporting to deal with the whole subject of class teaching.

It appears, therefore, that the main fault of this book (if it be a fault) is one of omission ; and as it is more generous, and even more just, to praise a book for what it is than to blame it for what it is not, I hasten to assure the reader that this volume is as excellent a guide to the class teacher as may be found on the market. The writers have not only a theoretical knowledge of principles, but a close practical acquaintance with all the petty embarrassments that perplex the teacher in his daily task. They also display an engaging sympathy and humanity, qualities which are specially conspicuous when they deal with school discipline. A book, in fact, to be read and to be used.

P. B. BALLARD.

BOOK REVIEWS.

Learning and Teaching: By A. G. HUGHES and E. H. HUGHES. (Longmans, Green and Co., pp. 450. 7s. 6d.)

This book is styled "An Introduction to Psychology and Education" and is primarily intended for students in training colleges, although it is hoped that it will prove useful to teachers who may wish to familiarise themselves with modern educational psychology. The authors are careful to point out that they intend the book to be a text-book in the real sense of the term; "it provides a text which it is hoped will prove a convenient starting-point for a more exhaustive enquiry into the psychology, principles, and methods of education." One must necessarily keep this statement in mind in evaluating the volume.

The book opens with a clear and fairly comprehensive analysis of the inborn tendencies of children with justifiable emphasis on the importance of the recognition of individual differences. The development of the child is traced carefully and the writers are insistent in their reiteration of the necessity of activity on the part of the child. A useful balance is held throughout this early section between first-hand observation and experimentation. Interesting chapters are devoted to the development of character, muscular skill, taste and sociability. The curriculum comes in for some critical examination, but here again the authors show judgment and discretion with possibly a tendency towards the preservation of the *status quo*. Child maladjustment is sympathetically discussed. Chapters follow on "The Art of Teaching," "Questioning," "Principles, Plans and Methods," "Work and Fatigue," "General Effects of Learning and Teaching," with a concluding chapter on "The Development of Personality."

Most of the chapters have appended "Observations and Experiments," "References for Reading," "Additional References" and "Essays and Discussions." These show careful and judicious selection.

The authors have brought to their task of writing this book much theoretical knowledge which has been carefully and thoroughly tested in the home, school and college. Their experience has been remarkably wide and their selection of material reflects this experience and their own mature and critical judgment. The book will find its place among the text-books for training college students, and many candidates who have carefully read this book will find themselves quite well prepared for their Psychology and Principles of Education papers. But such students will be well advised to remember that this book is only an introduction to very wide subjects, and is "the bare minimum" on which they should start their professional careers. Many students will look upon this as "light fare" and will go elsewhere for a more nourishing and, at the same time, more stimulating, diet. The authors may consider perhaps that, if such is the case, they will have succeeded in achieving their stated aim. The increasingly heavy demands that are being made on training colleges with the possibility that these will be still further increased in the future, raise the serious problem as to the types of text-book in educational psychology which will be of most value in meeting these needs. There is scope for experimentation in text-book production, and is there not a demand that some of the old traditions which, in part, fetter this book should be definitely broken? E.C.C.

The Psychology of Adjustment: By LAURANCE F. SHAFFER. (Harrap and Co. pp. 600. 10s. 6d.)

The sub-title of this book is "An Objective Approach to Mental Hygiene," and it deals with applied psychology. As the editor states in the preface, the problems which it treats are those which must be faced by the lawyer, the teacher, the physician, the salesman, and the parent. Applications are dealt with or indicated throughout but the last chapter is devoted entirely to a consideration of mental hygiene in different fields, such as education, the home, industry, and social work.

The seventeen chapters group themselves under four headings:

I.—Psychological Foundations. Here origins, development, modification, motivation and adjustment of behaviour are discussed.

II.—Varieties of Adjustive Behaviour. Under this head special attention is paid to socially inadequate or undesirable forms of adjustment and the method of case study is used.

III.—Personality. Again case studies are used and these with some experimental researches furnish data for some theories on the development of personality. This section considers the reasons for individual differences in personality and in the various manners of adjustment.

IV.—Techniques of Mental Hygiene. Methods of study of individuality and treatment.

Suggested readings are given at the end of each chapter and questions and exercises at the end of the book.

The author claims to be steering a middle course between the psychoanalytic theory and the strict behaviourist theory. He allows "introspection" and "analysis," but he has no use for "the hypothesis of the unconscious" and "complexes," which he feels are no longer useful though they may have been of some temporary service in the past. He avoids the use of psycho-analytical conceptions, but devotes a chapter to the principal theories "because of their historical importance."

He considers that the "instinct theory" was a confession of ignorance, and the so-called instincts are really learned.

It is stimulating to have generally accepted notions attacked and the advanced student will find much of very great interest and help in the book.

The volume was designed to serve as a text-book in courses such as those generally called "Mental Hygiene," "Mental Adjustment," or "The Psychology of Personality." The present reviewer agrees with a suggestion put forward in the preface that the book is an appropriate text for study *after* an introductory course. It should provide endless discussion in class.

The Educational Guidance of the School Child: Under the authorship of H. R. HAMLEY, R. A. C. OLIVER, H. E. FIELD, SUSAN ISAACS, with a foreword by Sir Percy Nunn, and Introduction by K. Struckmeyer. (Evans Brothers, Ltd., Montague House, Russell Square, W.C.1, pp. 122. 3s. 6d.)

In the cautious and practical introduction to this book the Director of Education for the County of Wiltshire describes how it came into being as the result of the attempt to develop individual study of children in the county with the assistance of some of the authors of this booklet. Mr. Struckmeyer emphasises in this introduction especially the practical consequences which it is hoped and expected will follow the observations made of the children. These observations have been made with the guidance of extensive report forms which are given in the appendix, separate forms being available for (1) entrance into the infant school, (2) the infant school, and (3) the junior or the senior school. In the main body of the booklet the other authors contribute chapters on the use of cumulative records and the making and interpretation of the records, both in the junior and in the infant school. Guidance is given as to the kind of behaviour and facts for which the teacher should be on the look out.

The book should provide a very useful guide to teachers who wish to increase their knowledge of pupils or to co-operate in a large scheme of observation, and the very process of such recording should itself cultivate that psychological attitude which is so much needed. The report forms give space for records about home circumstances, physical condition, intelligence, and various other aspects of mental development, personality and attainment. The introduction points out that in the process of experimenting with forms, the original forms were reduced by combining under one head, items that had a good deal in common. This no doubt was desirable from one point of view in that it reduced the size of the forms. It does seem, however, that in some cases it was carried too far. For example, what information to subsequent users of the form is conveyed by a mark showing that "Reliability" is average on the Rating scale, when Reliability is taken to cover (*a*) truthfulness, or (*b*) the taking care of things, or (*c*) behaving in the same way when the teacher is not present as when she is watching him, or (*d*) the tormenting of younger children if no grown-up is near ?

Educational, Psychological and Personality Tests of 1936. Including a Bibliography and Book Digest of Measurement Books and Monographs of 1933-36: By OSCAR K. BUROS. (School of Education, Rutgers University, 1937. 75 cents.)

In 1935 the School of Education of Rutger's University initiated a series of annual test bibliographies. The present work includes tests published in the year 1936 and tests omitted from earlier bibliographies. Hereafter, the annual bibliography is to include all tests received up to the time of printing.

The aim has been to include all commercially-available pencil-and-paper tests published as separates in the United States and the British Empire. Numerous tests are included which have been constructed for use with specific text-books and for practice purposes. Many non-pencil-and-paper tests are given, but the author himself considers that this class of tests is inadequately represented.

The writer would appreciate information about new tests and tests omitted in this or earlier bibliographies. As he declares, the task of locating information about all of the new tests being currently published is an impossible task without the co-operation of test authors, technicians, and publishers.

A new section has been initiated in this number. Books, monographs, and pamphlets published in the years 1933 through 1936 on the subject of measurement and closely related subjects are listed and descriptive and critical excerpts concerning these are quoted from the book reviews found in numerous American and English journals. If this book review section proves valuable it will be continued. Surely there can be no doubt of its value and interest to all concerned with tests and testing, and of their gratitude to those who put forward in such a business-like and useful form a vast amount of information otherwise so scattered that a search for specific items is often impossibly time-consuming, and who keep them up to date in the progress (or otherwise) of testing.

This bulletin, as well as Educational, Psychological and Personality Tests of 1933, 1934, and 1935, which is still available, can be obtained from the School of Education, Rutger's University, New Brunswick, New Jersey.

The Education of the Emotions through Sentiment Development: By MARGARET PHILLIPS, M.A. (George Allen and Unwin, 1937, pp. 318. 8s. 6d.)

Educational writers, Miss Phillips notes, habitually advocate the training of feeling or the establishment of desirable sentiments, but neither they nor the psychologists as yet have much that is substantial to say about the details or the means. " The (controversial) findings of analytic psychologists are rich in suggestions as to the early unconscious stages of sentiment formation, but do not take us far into the later, more conscious stages. McDougall has given us . . . much fruitful speculation concerning the development of social and moral sentiments. The ' religious sentiment ' has received detailed consideration from specialists in this field. But as regards the vast majority of the sentiments into which the emotions and attitudes of the common man are in fact built, we find ourselves faced with one of the biggest existing gaps in educational psychology." In the present book the writer has collected the life-histories of some 400 sentiments and interests given her by 275 persons of very diverse experience and upbringing. These autobiographical accounts are a quarry of rich material which must have been difficult to bring into order, and Miss Phillips is to be congratulated on the success she has achieved. As is suggested by the word " built " in the passage quoted, she has used in the main the idea of units combined into larger structures, and the effect is sometimes a little too much that of a mosaic ; but she is fully capable of criticising her own results as well as those of her predecessors, with freshness and with excellent common sense. I like her remark that " psycho-analysts concerned with problems of sex-inferiority and sex-antagonism might profitably turn their attention for a spell from anatomical differences between the sexes to differences in conditions of life in the average Victorian household."

I hope that in further work Miss Phillips will pay still less respect to some of the apparatus handed down, and use still more of her own exploring and picturing judgment. Meanwhile every educational library should put this book into the gap on its shelves. H.M.W.

The Duration of Attention in Young Children : By M. V. GUTTERIDGE. (Melbourne University Press in association with Oxford University Press, pp. 52. 2s. 6d.)

This is one of the publications supported by a grant from the Australian Council for Educational Research. The general plan was to note the length of time that little children under six years of age continued to occupy themselves with the same plaything or type of activity. Five hundred and fifty children were observed, about a hundred of each year from two to six. They were observed under play conditions in nursery schools and kindergartens. In measuring the length of attention-process, breaks of less than one minute were ignored ; this and other factors differentiate this enquiry from more exact laboratory studies. On the other hand the method has the advantage of studying the children under more natural conditions.

A few children continued the same activity more than a hundred minutes. The writer quite rightly points out that the error of supposing that a short attention period is necessarily a sign of lack of intelligence : it depends on the type of activity. The more intelligent child will be more quickly bored with the simple activity, while the feeble-minded may continue repeatedly carrying out almost meaningless performances. The author suggests that children who diverge very much from the normal, in respect to the average length of attention period, need particular attention. There is a paragraph on page 49 referring to the forming of "the habit" of attending which seems inconsistent with some of the sounder psychological phraseology of the rest of the book.

Infant Behaviour, its Genesis and Growth : by ARNOLD GESELL and HELEN THOMPSON, assisted by CATHERINE S. AMATRUDA. (McGraw-Hill Publishing Co., Ltd., Aldwych House, London, pp. 343. 18s.)

This important work is a more detailed study than even Professor Gesell has previously issued of certain aspects of mental development in the first year. One hundred and seven infants were studied from families of " middle social status." The main portion of the book is devoted to a careful description of behaviour displayed in twenty-five different situations and noted at fifteen different ages, between four weeks and sixty weeks. In this section of the book there is a large amount of valuable material for students of genetic psychology. Such simple processes as play with cubes are studied over as long a period as from three months to twelve months. Later, the authors discuss the autogenetic patterning of behaviour, considering both posture, manipulation, perceptual and adaptive behaviour, social and language behaviour. Of special interest from a somewhat more theoretical point of view is the fifth chapter on " Mental Growth and Maturation." Here, as elsewhere, Dr. Gesell and his colleagues emphasise the great importance of maturation, while not of co [illegible] t of learning and the development of specialised " skill," [illegible] the apparent development of skill is really the maturing [illegible] aviour". The volume is a welcome addition to the valuable contributions which Dr. Gesell has already made to the study of infant psychology.

C.W.V.

Our Children in a Changing World: By ERWIN WEXBERG, M.D., and HENRY E. FRITSCH. (Macmillan. 8s. 6d.)

The educational principles enunciated in this book are those of Adler and his school of individual psychology. The authors emphasise the unity of the child's personality, showing that no incident of behaviour can be treated in isolation, and insisting on the child's right to free development. The function of the parent or teacher is to help the child to develop as a responsible individual, and he must avoid interfering with this development by obtruding false ideas of the adult's own dignity and importance ; and the goal of education is " to enable the growing individual to take his place in the human community and to adjust himself to it."

The book is divided into three parts : the first is concerned with general problems affecting all children, such as the economic and social environment, the child's position in the family, and his general physical characteristics ; the second deals with special problems—different types of behaviour difficulties, bad habits and nervous symptoms ; and the third with education and corrective measures.

The authors' style is clear and interesting and illustrations are given from their own work in the New Orleans Institute for Child Guidance.

The book should be a real help to parents and teachers who want to understand children, and in the light of that understanding to help them to reach maturity as smoothly and as happily as possible.

M.C.P.

Dynamic Causes of Juvenile Crime: By NATHANIEL D. M. HIRSCH. (Sci-Art Publishers, Harvard Square, Massachusetts, pp. 250.)

Dr. Hirsch is already known as the author of various psychological studies dealing with heredity and environment and allied topics, published by Clark University and Harvard University Presses. In this new volume he gives a detailed report of six hundred juvenile delinquents and an analysis of causal factors. A wider study includes the study of the parents and homes of two thousand juvenile delinquents. Subsequent chapters give detailed reports on a few selected cases. The chief interest in this particular study of delinquency lies in the stress which the author puts upon innate factors. " Broken homes and unfavourable surroundings in general," he writes, " are in large part a result of the poor constitutional make-up of the parent or parents." Nearly half his delinquents studied, as he points out, come from unbroken homes, while it is estimated that between twenty and thirty per cent of all American homes are broken, and yet less than one per cent of *all* homes furnish juvenile delinquents, and nearly half of these are from unbroken homes. There is the already familiar stressing of the importance of a conjunction of two causes, as for example, defective intelligence coupled with personality and emotional deviations. In general Dr. Hirsch puts defective intelligence very high in the list of causes of delinquency. The work is undoubtedly a significant addition to our studies of juvenile crime.

Individual Differences: By FRANK S. FREEMAN. (Harrap, pp. xi+355. 7s. 6d.)

Books which are based upon wide fields of experimental and statistical psychology are so frequently mere compilations that it is a special pleasure to read Professor Freeman's excellent book. Whilst he brings into review a large mass of material, it is first thoroughly digested, the reasons for variations between the results of one writer and another are discussed, and the whole material is set in a general argument which binds it together. So much so, indeed, that in some ways the book is wider than its title suggests (and none the worse for that), though all the time the author is leading us up to the fundamental fact of individual variations.

We have here discussed not only, as one would expect, the differences due to sex, the influence of race and nationality, the differences in special abilities, but also chapters of great interest on the influence of inheritance and of environment, and a chapter especially useful to the student of child psychology dealing with the factor of age from infancy to adolescence.

Professor Freeman writes in a clear style, and is critical and balanced in his judgments.

C.W.V.

General Psychology : By W. J. H. SPROTT. (Longmans, Green and Co., pp. 466. 7s. 6d. net.)

In the preface to this book the author states that he has attempted to introduce "General Psychology" to the general reader and the student. He is also much concerned to disavow any allegiance to a "School" of psychology, and he has cast his net very widely so as not to miss any part of the possible catch in modern psychology.

The result is that the book is an interesting introduction, and covers an enormously wide area ; the author has critically examined the authorities representative of the different schools and has given a well-balanced résumé of each.

A serious problem confronts the writer of an introduction to General Psychology to-day. Mr. Sprott has chosen one method of approach to the solution of that problem. To some extent he may have succeeded, for the hard-working capable student in university or adult education classes, with the assistance and guidance of his lecturers and tutors, will be led to wend his way carefully through the many difficult mazes of the book. The less capable student and the unassisted general reader will often be bewildered and will find the book overloaded and, in parts, obscure.

An announcement is made on the fly-leaf that, "An edition for the general public is published under the title of 'Psychology for Everyone.'"

Religion and Contemporary Psychology : *the Riddell Memorial Lecture, Armstrong College, Newcastle-on-Tyne* : By T. H. PEAR. (Oxford University Press, pp. 49. 2s. 6d.)

This is the report of three lectures delivered at Armstrong College, Newcastle-on-Tyne, the subject of the three lectures being "The sense of reality, conscience and moral behaviour, and personal relationships."

Professor Pear has naturally interpreted the request for him to give these lectures (primarily devoted to "the ethics and tenets of Christianity") as being a request for the discussion of some psychological topics which have some connection with the philosophy of religion.

In the first lecture he deals with illusions and with the psycho-analyst's claim that he "brings the patient in contact with reality."

The second lecture discusses various interpretations of conscience, and the last deals with "personal relationship" with a glance at class distinctions and some other social problems of the day. The style of treatment is lively, not without humour, often suggestive, and broad in outlook, references and quotations ranging over a very varied field from philosophers and psychologists to novels and The Listener, and once or twice even a reference to the Gospels.

The Education of Backward Children, with a Section on Juvenile Delinquency in England and Wales. (Evans Bros., Ltd., in association with The University of London Institute of Education. 1s. 6d.)

This little book contains a foreword by Sir Percy Nunn, in which he discusses the policy of publishing volumes of articles dealing with important and well-defined themes from the "Year Book of Education." This, the third volume of the series, comprises articles contributed to the Year Book for 1936.

Part One deals with the Education of Backward Children. Professor Hamley contributes an introductory survey. Dr. Fildes devotes an interesting and illuminating chapter to Some Psychological Considerations, and Dr. Schonell writes on the Education of Backward Children, Causes of Backwardness, Methods of Diagnosis and Organisation, and Mental Characteristics of and Teaching Methods for Dull Children. An anonymous contributor has written a short but interesting article on Administrative Problems and the "C" Child.

Part Two deals with Juvenile Delinquency in England and Wales, and consists of a General Survey by Sir Vivian Henderson, and Dr. Field's contribution on Psychological Aspects of Juvenile Delinquency.

The Institute of Education and the publishers are to be warmly thanked for making these valuable contributions to current educational thought available to a much larger number of readers, and all those interested in the two important problems discussed in this volume will gain much from a careful and critical analysis of these articles.

That Inferiority Feeling: By JOHN S. HOYLAND. (Allen and Unwin, pp. 256. 7s. 6d.)

This book is, as the author states, the attempt of an amateur in psychology to examine and propound for the ordinary reader the main contributions of Dr. Alfred Adler to psychological thinking. Part One deals with Causes and Conditions. A chapter on inferiority feeling is followed by one on Social Activity, and chapters are devoted to Dominance and Coddling as the main causes. The chief results are tabulated under five headings, to each of which a chapter is allowed: Fear, Egotism, Jealousy-Hatred, Superiority-Striving and Conceit. The less important results are dealt with in the next three chapters.

Part Two is concerned with Cure, and applications of Adler's psychology to economic, international and religious problems are suggested.

The book is written simply and clearly. It is unfortunate, however, that the author has not been sufficiently critical in his summary of Adler's work. The book is therefore lacking in balanced judgment, is marred by serious over-generalisation, and simplicity is suggested where, in practice, difficulty is met. Many people will read and enjoy the book, but the student of psychology will wish that "popularisers" were non-existent, and the critically-minded adherents of individual psychology may well regret the labours of some unwise disciples.

Mind, Medicine and Metaphysics: By WILLIAM BROWN. (London, Oxford University Press, pp. 294. 7s. 6d.)

This is a collection of essays and lectures composed during the last two or three years, "all dominated," as the author writes, "by the one intellectual purpose of achieving a philosophical synthesis of general viewpoints in psychology, medicine, and metaphysics." In a collec [illegible] at different times in different places one cannot expect a s[illegible] definite metaphysic, but the author shows his own trend [illegible] in the chapters on "Moral Obligation and Freedom," " [illegible] Free-will," "Psychology and Religion," and "Survival of Personality." The major part of the book is concerned rather with mind and medicine. Two of these deal with the problems of sex-control and the sexual problems of adolescence. As to masturbation, Dr. Brown takes an intermediate position between the older denunciation with threats of insanity and disease, and the more modern trend of making very light of it, and attributing evil largely to the mental suggestion. It is clear that Dr. Brown still believes very considerably in the power of suggestion and auto-suggestion; so much so that it is difficult to see why his cures of nervous disorders which are supposed to be brought about by psycho-analysis cannot be explained merely as due to suggestion. As usual Dr. Brown is lucid and interesting in style.

Human Psychology. By J. R. BUTLER and T. F. KARWOSKI. (London: Pitman, 1937, pp. xvi+447. 10s. 6d.)

The need for an authoritative text-book of psychology remains urgent. It must be written in a compact and matter-of-fact style, and anyone who proposes to write it should first study the standard text-books of other sciences, and learn from them not to waste words, and how to avoid writing down to readers who are assumed to be of low intelligence. The authors of the book under notice have not submitted to this discipline, and their work, interesting and readable though it is, consequently falls between the popular introduction and the elementary text-book. Some of it is discursive conversation about the obvious, and the remainder is presented in so leisurely a style that the hard core of research results fails to stand out as more important than the rest of the discussion. At its moderate price it may be found useful in W.E.A. classes. It covers a wide range of subjects, but some important gaps will be noted. There *is* a psychology of volition, and the chapter here on "Motivation and Emotion " is not an adequate substitute for it, while the psychology of the thought processes is in better case than would be gathered from the treatment in this book. It may be remarked once more that there is an extensive psychological literature in other countries than America, reference to which would reveal topics with which the English student is expected to concern himself. If the writers had been less anxious to make things easy for their readers, their book would not halt so disappointingly on the way to being a really good one. A.W.W.

Conduct and Ability: By FRANCES BANKS. (Methuen and Co., London, pp. 399. 10s. 6d.)

This is described in a sub-title as " a text-book of psychology from the hormic and noegenetic standpoint with practical exercises for students." It touches, though often rather superficially, most of the important topics of elementary psychology. The author refers to a possible criticism of the book, namely the too frequent use of somewhat lengthy quotations. She quite rightly replies that it is desirable that students should be led to the works of the experts ; but the main objection to her method is not so much that it leads to a longer book as she herself suggests, but rather because it gives the impression of scrappiness. In addition the tendency of many beginners to accept ideas on the authority of some well-known writer is apt to be encouraged, where an author repeatedly writes such phrases as " MacDougall says this," and " or Freud pointed out so-and-so." Too frequently we are left in doubt what the author herself thinks of things said by the very many authors whom she quotes.

Psychologische Diagnostik: By RICHARD MEILI. (Ernst Reinhardt, Munich, pp. 256. RM. 6.)

This is described as an introduction for psychologists and educationists. Indeed, it is a very good outline of psychology in its special relation to ' tests ' of many different kinds.

After discussing the psychological basis of tests, the author proceeds to evaluating results and the precautions to be taken both when testing and in subsequent statistical work. He finds a place in which to consider the question of a general factor, and he deals with scholastic and vocational tests in schools.

The appendix contains a number of examples of tests, a section on statistics, and a bibliography of over one hundred references, of which liberal use is made in the text, selected from among the most illuminating researches published in German, English and French.

The drawback from one point of view is that this work is in German and has not been translated.

Psycho-Analysis Explained: By DOROTHY R. BLITZSTEN. (Allen and Unwin. pp. 78. 3s. 6d. net.)

The title of this book is attractive ; the size of the book raises serious doubts as to the validity of that title. The chapter headings are, " Why be Analyzed ? " " How Psycho-analysis Works " ; " How it is Done " ; " Who is the Analyst ? " " Whence comes Psycho-analysis ? "

Dr. A. A. Brill contributes an introduction in which he says, " I am sure that the book will be of great interest and enlightenment to all seekers of the truth about Freud's psycho-analysis."

An interestingly written little essay, but the title is hardly appropriate.

A Manual of Psychological Experiments: By BORING, LANGFELD, WELD and collaborators. (Chapman and Hall, pp. ix+198. 8s. 6d.)

A book of experiments for the laboratory. Most of the experiments, which are planned to take about one hour each, though some take longer, can be performed with simple apparatus. The directions for carrying out experiments are clear, and references are given for further elucidation of the text and for additional reading. The book is well printed, and the binding allows the leaves to lie quite flat when open. The present writer has used this work with one of his classes and can recommend it with confidence to other teachers.

The Life of Winifred Mercier: By LYNDA GRIER.

All who are interested in the development of education in this country will be grateful to Miss Grier for her vivid and sympathetic account of Winifred Mercier's contribution to its story, more particularly in the sphere of the training colleges, and through them, of the elementary schools. The book traces not only a chapter in the history of education, but also the growth of personality in a woman who was " a leader in her generation " and whose single-mindedness of purpose, clarity of vision and spiritual insight carried her triumphantly through life against what seemed overwhelming financial and physical odds. Miss Mercier did not live to see the full fruits of her labours, her goal was the emancipation of the elementary schools from the shackles which had held them for so long, but she knew that this freedom must come through the teachers themselves and she lived to know that she had planted in the hearts of innumerable students the seeds of her own love of " beauty, light, freedom, fellowship and laughter," and that in time those seeds must bear the fruit for which she had fought and prayed.

The book follows Miss Mercier's career from childhood through school, training college, and her first post in Edinburgh, where her enthusiasm and originality in teaching enthralled her pupils who had not known before " what fun work could be." Edinburgh was followed by the unexpected joy of three years at Oxford, and a brilliant first class in the Honour School of History. From then on Oxford had her heart, and after periods of teaching and lecturing at Manchester High School and Girton she began her real life work, which was "the building of a bridge between Oxford and the elmentary school" through the medium of the training college.

Her first opportunity came at Leeds Training College, where she was appointed Vice-Principal in 1913. The story of that period with its disappointments and difficulties accentuated by a misunderstanding at her appointment, and by the divergent and irreconcilable views on education held by the protagonists, is handled tactfully if somewhat laboriously. She resigned and members of the staff with her, but " a battle for liberty had been won for others by those who had to retreat from their own posts " and far-reaching training college reforms were heralded.

It was at Whitelands, where she was Principal from 1918-1934, that she came into her own, and two chapters tell of the magnificent work which she did for the college. Even when the opportunity came to return to Oxford, which she loved, she refused to turn her back on work which she felt needed her more and into which she had now thrown herself with all the tremendous vigour and force of which she was capable. The buildings at Putney into which the college moved in 1930, are an external witness to her vision of what a training college should be. In connection with the rebuilding of the College there is one inaccuracy, the money was produced mainly through the efforts of the Central Board of Finance of the Church of England who are now the landlords.

Miss Grier writes with understanding of Miss Mercier's educational work and policy, within and without the college, of her deep interest in religious teaching and of her conviction that " education is a great spiritual force " and cannot be separated from religion.

Not the least part of a fine book is Professor Dover Wilson's admirable introduction. It is a book for all lovers of children and young people.

The Rural School in Australia: Edited by PERCIVAL COLE, M.A., Ph.D., F.C.P., F.R.S.A. (Educational Research Series No. 49.) (Melbourne University Press in association with Humphrey Milford, Oxford University Press. pp. 244. 10s. net, in England.)

The title of this book, with its significant singular number, hardly indicates the wide scope of the topics discussed by a team of experts under the Vice-Principal of Sydney Training College.

The reader wi[illegible] vey of the various phases of Australian Rural Education, [illegible] tralian History and Geography, and a lucid exposition [illegible] al, and economic movements.

The symposium is not merely a series of statements about the Asutralian rural school; most sections also contain reasoned and often challenging examination of the educational principles and problems involved; and though perhaps no specifically "Australian" advance in the theory and practice of education can be claimed, there are, nevertheless, definite ways of dealing with such matters as the single-teacher school, or the rural central school, as exhibited by the "District Rural School" of New South Wales and the "Area School" of Tasmania.

The educational administrator will find much to interest him in the working of a centrally controlled bureaucratic system, and in such matters as the adaptation of school buildings, equipment, and courses of study to the specific needs of the Commonwealth; the student of comparative education is provided with statistics, schemes, time-tables, and so forth; while the theorist will meet with useful psychological discussion of the environmental and hereditary influences in the make-up and development of the rural child.

With true "Anzac" forthrightness, some of the contributors dare to comment adversely on certain aspects of their own system, e.g., the dangers of rigidity in control and the employment of monitors. Some readers will be startled by such provocative dicta as, "The avowed aim of society should be to decrease the number of men employed in the country that as many as possible may have the advantages of town life" (some enthusiasts of the opposite school of thought would wish to transpose the words "country" and "town" in this sentence).

Again, a Folk High School, even with lectures mainly "cultural," would hardly fulfil the highest Danish ideals unless a communal resident life were included.

Not all sociologists will agree with the assumption that the large "industrialized" farm is the ideal of the future.

There is a truly scientific attitude throughout the book; it insists on the liberal provision of opportunity for individual development, and on the paramount influence of the teacher, even within the limits of a possibly narrowing system; there is frequent and apposite comparison with the aims and methods of other communities, and a broad humane outlook; all these render the work a valuable addition to the series of educational research. W.G.T.

Pitch and Intensity Characteristics of Stage Speech: By MILTON COWAN. (*Archives of Speech*, University of Iowa, Supplement. December, 1936, pp. 92.)

The research described formed part of a programme for the study of voice in the theatre. The voices of ten prominent actors and actresses on the New York stage were recorded on high quality phonograph records. Most of these players spoke dramatic selections from the plays in which they were appearing at the time. Selections from the records were analysed by means of standard phono-photographic technique. These analyses yielded graphical and quantitative data concerning pitch and intensity in their relation to the time elements.

Some interesting results were:

(1) Dramatic speech is characterised by a pitch-range wider than that reported for any other type of speech.

(2) It has greater variability, both of pitch and intensity, than any other type of speech thus far studied.

(3) Syllables, according to the traditional lexicological division, may be qualitatively delineated by physical intensity curves in about 85 per cent of cases.

(4) Classification of pitch movements according to possible physiological functional variations, viz., rising pitch, falling pitch, sustained pitch level, shows that these variations are related to the individual speech habits of any given speaker.

(5) Phrases were introduced with a rising pitch attack and concluded with a falling pitch release so consistently that this may be considered a general law for such (dramatic) speech.

There is no doubt of the value of such investigations for the physicist and the physiologist, and the quantitative aspect of this work is excellent. Psychological interpretation does not seem easy, since the total setting in which any one sound, e.g., a vowel, occurs, may alter the perceptual pattern completely. Within its limits, however, the work is of great importance for the specialist student of speech.

T.H.P.

The Construction and Use of Achievement Examinations: Edited by HERBERT E. HAWKES, E. F. LINDQUIST and C. R. MANN. (Harrap, pp. 497. 8s. 6d.)

The thesis supported in this book is that facts are learned because it is assumed they will assist the student to interpret, understand, appreciate or modify his environment; so facts of the encyclopædic kind are less likely to prove of functional value than are interpretative ideas. The tests in common use for many past years are of the essay type, suitable for the superior types of mind, but they inhibit development in minds of lower power.

The authors have dealt very fully with a field of examining which is worth exploit, namely the "multiple choice" type of question. They have shown its means of application in examining progress in many of the subjects ordinarily included in the school curriculum, and they have demonstrated its advantages quite clearly. They indicate development from the simple type of question requiring the selection of one answer from a short list of choices, to much more complicated forms. The technique of setting questions and marking answers is nicely dealt with.

On the whole one feels attracted by the method for which there are so many obvious applications in practice, nevertheless to remember a fact when a clue has been given is not the same as to remember it when practically the whole initiative rests with the examinee who supplies, rejects or accepts his own clues and sets them forth according to his ability; the influence of chance has been shown by Symonds to be much less in such instances.

The compilers of the present work do not ignore other means of examining, but they describe very carefully that which they have chosen, making it clear that the examiner must be a master of technique.

"Achievement Examinations" demands attention; its production has been underwritten by the Carnegie Foundation, but it is a piece of constructive work, and as such, is particularly welcome.

Juvenile Delinquency: By MARY TENISON WOODS. Educational Research Series No. 50. (O.U.P. pp. 80. 3s. 6d.)

Since 1933 the Australian Council for Educational Research has made three grants for investigation into the problem of the young delinquent: the first made possible the compilation of statistics giving details of offenders and offences; the second resulted in the establishment of a Children's Court in South Australia; and the third was for the purpose of a report on the nature, scope and potentialities of institutional treatment for the juvenile delinquent. It is this report which is now published.

In an introductory chapter the author analyses the problem generally, accepting and reiterating the conclusions of Dr. Burt, Dr. William Healy, and Dr. Hamblin Smith and criticising the methods at present obtaining in Australia, especially the "haphazard affair" which passes for probation. She deplores the committal to reformatories of country children brought before the courts on slight offences, condemns the fact that there is no provision for defective delinquents, and in her investigations into all the institutions in New South Wales, Victoria and South Australia, finds little to applaud and much to lament. Only at Tally Ho in Victoria did she find any evidence of self-government among delinquents in an institution, and nowhere was there any system of after care.

Her chapter on what institutions might be is mainly an appreciation of English and American institutions, which, she asserts, aim at constructive treatment, stressing freedom, responsibility and individual needs. The final plea is for selected personnel and an enlightened policy to deal with a problem which Australia is only just beginning to tackle.

Animals and Men: Studies in Comparative Psychology: By DAVID KATZ. (Longmans, pp. 263. 12s. 6d. net.)

The work of Professor Katz in animal psychology is well known, and a book on the subject by him is sure to be greeted with lively interest. This book will not disappoint these high expectations. All readers, whether simply looking for fascinating and authentic description, of "Clever Hans," police-dogs, or other animals from hens to chimpanzees, or interested in scientific methods to be adopted in animal psychology, or in the comparison of human behaviour with that of the animals observed and described, will find the book packed with material, much of it original, of the greatest interest.

Some special problems of animal psychology are presented, on which the author has worked with his students. All these problems touch directly on comparative psychology.

It is difficult to pick out any one chapter of outstanding interest, but special mention may perhaps be made of the chapter headed "The Social Psychology of Animals," in which the importance of this study for the sociology of man is emphasized. In it are described communities of animals, and such topics as the different kinds of matrimonial patterns they adopt; means of communication; the break-up of the family; neurotic behaviour brought about by social isolation; the display of social rank and despotism in certain animal communities; and individual differences in animals.

The book is well turned out, and the illustrations add to its general attractiveness. The author has been extremely fortunate in his translators; rarely is there any indication of translation and the style throughout is simple, lucid, and very effective.

Medical Research Council Industrial Health Research Board. Report No. 77, Fatigue and Boredom in Repetitive Work: By S. WYATT and J. N. LANGDON (assisted by F. G. L. Stock). (H.M. Stationery Office, 1937, pp. 85. 1s. 3d., postage extra.)

The present report supplements several previous studies of repetitive work by Mr. S. Wyatt and his collaborators. It deals with larger numbers and it extends the methods previously used. The general aim was to collect information on the nature, causes and prevalence of boredom and discontent among operatives employed on simple types of repetition work. The subjects in this investigation were 355 experienced girls in four factories, situated in widely different parts of the country, and employed on various forms of light repetition work. Interesting results were obtained on the following points amongst others: individual differences in susceptibility to boredom; the waxing and waning of boredom during a spell of work; devices adopted by operatives to counteract the onset of boredom; the effects of boredom on work and on rate of learning the work; the relation of boredom to intelligence, special ability, and temperament; effects of slight differences in work; effect of gramophone music; factors underlying boredom and discontent. Relevant problems are discussed, an important one being the possibility of applying the knowledge of the nature of boredom and its relation to personal characteristics and to condition of work as an aid in selecting individuals who are most suitably qualified for repetition work, and in the arrangement of working conditions so that boredom is less likely to arise.

Examinations and the Examinee: By C. W. VALENTINE, M.A., D.Phil. (The Birmingham Printers, Ltd., 1938, pp. 39. 1s. 6d.)

Professor Valentine has done a useful service in discussing the examination problem in so brief and clear a form. Ir[illegible]ce he reveals the imperfections and frailties of examinations [illegible] to the university, and he preserves a calm and discerning judgment in handling controversies that have at times generated considerable heat.

The suggestions for reform deserve careful attention, especially those for entrance examinations to secondary schools (Chapter II), and the abolition or modification of the group system in the School Certificate Examination (Chapter III). The harmful influence of examinations on school work is clearly demonstrated, and the excessive influence of university scholarships shown. The whole book is an indictment of the dominance of examinations in our education system. Such indictments have been usually met by the question : " What is there to put in their place ? " Professor Valentine has made a valuable contribution by showing that means are available for lessening the evils he has described. It is to be hoped that he will be read by all examiners and administrators.

FRANK SMITH.

German Education To-day: By THEODOR WILHELM and GERHARD GRAEFE. (Obtainable from the Anglo-German Academic Bureau, 45, Russell Square, London, W.C., pp. 44. 1 s.)

This booklet is a revised and enlarged edition of the recent publication by the same authors. No one can deny its authority and accuracy. As a general presentation of the modern German educational system it is the best that has appeared. The bibliography is particularly valuable. The exposition is clear and the English, with one or two exceptions, careful. The photographs are of unequal merit.

The authors now apparently feel that the time has come for more positive statements on the aims of National Socialist education. In this they may be justified, but at the same time they expose themselves to criticism. Is it strictly true to say that the Hitler Youth holds the school authorities in respect, and does it always make allowance for the part played by the home and family in education ? The question would not be answered affirmatively everywhere in Germany. The authors do not make it quite clear that the retention of Latin as a discipline is an official attitude still greatly respected in Germany. The reader might have the impression that the authors are merely expressing an opinion. Unclear phrasing leads us to believe that there are no girls in the Arbeitsdienst. " England " is invariably wrongly used.

A.T.

Introduction to Physiological Optics : By JAMES P. C. SOUTHALL. (Oxford Univ. Press, pp. x+426. 21s.)

This book will doubtless be of great use to those who are engaged in technical pursuits as opticians, photographers, medical students, etc., but because visual perception offers the psychologist many unsolved problems he, too, will find time well spent in reading it. Whatever phenomena he investigates whether of spatial perception, panoramic, vision, colour, and twilight vision, colour blindness or of a host of others, he can form no theory which is not supported by physiological and physical facts. " Physiological Optics " succeeds in setting out succinctly the foundations of what is necessarily to be known if one wishes to take up a proper critical attitude towards theories put forward from time to time.

No attempt is made to deal with psychological opinions, but a book of the kind cannot fail to note how indeterminate is the margin between physical, physiological and psychological discussion. The second half of the work is likely to be of higher interest to the psychologist, and above all he will be attracted by the chapters on the temporal and spatial reactions of the " organ of vision."

Secondary School Examinations and the Curricula of Secondary Schools, with Suggestions for Reform : By Sir PHILIP HARTOG, K.B.E., C.I.E., LL.D. (National Union of Teachers, pp. 34.)

This is an address delivered to the Higher Education meeting at the Portsmouth Conference of the National Union of Teachers, 1937. Sir Philip gives in it a résumé of some parts of the book which he wrote in collaboration with Mr. E. C. Rhodes, "An Examination of Examinations." In addition he sets forth with clear and vigorous argument some definite and drastic proposals for the reform of the School

Certificate Examination. This largely consists of the adoption of the scheme of Dr. W. Edwards, the former chief inspector under the Central Welsh Board, namely, that certificates should be given to every pupil stating the performance in the various subjects. There is, however, an important modification of the scheme in that Sir Philip would abolish entirely examinations in English Literature, History, and General Science, as being harmful to the teaching of these subjects, which they undoubtedly often are.

Movement a Clue to Brain Action: By HELEN COOMBER. (Faber and Faber, pp. 196. 3s. 6d. net.)

Miss Coomber has written an extremely interesting little book. She came under the influence of the late Dr. Francis Warner in her early teaching career, has had a very wide experience in educational work and a few years ago, on reading some unpublished work of Dr. Warner, became convinced of the importance of his work and of its connection with much of the more recent research in education. Further observation and research along Dr. Warner's lines are necessary before definite conclusions can be drawn and Miss Coomber's book is designed to encourage such investigation. The author has quoted freely from the publications of Dr. Warner, has shown some interesting connections between his work and that of modern writers on education, and should stimulate research along the lines suggested, for only by such controlled observation can the main thesis be substantiated or rejected.

Modern Language Teaching on the Decline? By W. C. R. HICKS and N. HAYCOCKS. (Longmans, Green and Co., Ltd., pp. 22. 1s.)

The main contention of the authors, that the teaching of modern languages is on the decline, is a debatable one, but it is well that we should be reminded of such a danger. It is rightly pointed out that many teachers do lip-service to their aims and an attack on the teacher who uses the direct method text-book on indirect method lines never comes amiss. The suggested attitude towards the examination is a sound one and the proposal that an extra year abroad should be suitably recognised by the Board of Education is a praiseworthy ideal. This memorandum suffers perhaps from brevity; for example, the authors have not dealt adequately with the non-linguistic child, and if they feel sure that he exists, they cannot dismiss him in parenthesis.

A.T.

The Development of Emotion in the Infant: By W. E. BLATZ and D. A. MILLICHAMP. (University of Toronto Press. London, Oxford Univ. Press, pp. 44. 3s.)

This booklet is based upon the records made of the development of five children from the first month to two years of age. Records were kept by parents who were trained under the supervision of the St. George School for Child Study, University of Toronto. The main evidences of emotion which were considered were: (*a*) crying, and (*b*) " extreme forms of random and resistance behaviour." There was found a " consistent decrease in emotional frequency " with age and " increase in complexity of adjustment."

The record is useful as further evidence of emotional development at this period, but there is nothing particularly original in the results gained or in the discussion.

War Dance: By E. GRAHAM HOWE. (Faber and Faber, pp. 315. 7s. 6d.)

The sub-title of Dr. Howe's book is "A Study of the Psychology of War." The author has, in this volume, given his readers the substance of a series of lectures given under the auspices of the Home and School Council. Readers have an advantage over listeners here for the author's style of writing and of expression is often crude and sometimes unnecessarily difficult and involved. But the effort required to master the writer's main thesis is worth while, and students of social psychology will not be happy until they have subjected Dr. Howe's hypothesis to a long and critical examination.

Die Dankbarkeit bei Kindern und Jugendlichen : Von Dr. Franziska Baumgarten. (V. A. Francke, Bern, 1936, pp. 106, Fr. 4.80.)

This booklet gives an account of an enquiry carried out among a thousand children in the primary and secondary schools between the ages of seven and sixteen. In the main enquiry the children were asked to write down their greatest wish, then to state how they would show their gratitude to the one who fulfilled the wish. In another enquiry the judgments of children were taken on certain actions given in a story. The author concludes that gratitude is largely an inborn feeling appearing already in the smallest children. Kinds of gratitude are also analysed, but of course the study is limited by the restriction of the main enquiry to what children *say* they would do or think.

Baby's Point of View: By E. J. Partridge, F.R.C.S., L.R.C.P. (Humphrey Milford, Oxford University Press, pp. 94. 2s. 6d.)

Dr. Partridge is led to champion baby's point of view by the knowledge that neuroses are often founded during the first few weeks of life. The popular ideas that baby is " too small to understand " or " too young to miss its mother," are fallacies too often acted upon, because it suits adult convenience. The lifelong harm which may result from the neglect of baby's psychological and emotional needs during the period of helplessness is emphasized here.

Mothers will surely welcome a doctor's advice which corresponds with their own intuition, and one would like to see the principles laid down in this little book practised in maternity homes, and by nurses whose maxim is " to let baby cry " so long as its mother is out of earshot.

M.E.B.

VOLUME VIII. JUNE 1938. PART 2.

THE GENERAL INFLUENCE OF STUDIES.

BY WILLIAM PHILLIPS.

PART II.

VI.

The writer to whom I have just referred says that the general conclusions to be drawn from a study of the various researches into formal training, including those carried on by an improved technique of which he gives a valuable account, " seem to be that training depends upon the conscious acceptance by the learner of methods, procedure, principles, sentiments and ideals. If any word in this statement should be underlined it is the word *conscious*."[1] But I think it should be noted that transfer as a conscious process is the final product of a long period of training. The amount and character of the transfer of training that is seen in the pupil on leaving the elementary school at 14, the secondary school at 17, and even the university at 21, is sometimes small and disappointing. Yet a competent thinker like Judd believes that " we may make of our pupils eager seekers after truth." Nevertheless, many people who show much intelligence in some directions do not, when school and college have been left behind, evince any but the weakest desire to search for the truth about anything. What are the reasons that account for this barren result ?

(*a*) I suggest that the main cause lies in a disregard of the fact that every subject which is studied does, to a certain extent, represent the slow and imperfect, because largely subconscious, results of age-long human activity. This is specially true of every language. As I have already indicated, every speech bears testimony to mankind's natural tendency to generalise, organise and classify its experiences, but as this was for so long unaccompanied by any conscious and critical examination, linguistic forms are often irregular and inconsistent. A stage is however reached when consciousness is turned on them, and a grammar slowly formed, but, in the process, the impossibility of forming entirely *regular* declensions, conjugations, rules, etc., is minimised, and the importance of many irregular forms is masked by the use of the term " exceptions." To take one instance of the former statement : Latin is supposed to have only five declensions !

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[1] *Ibid.*, p. 240.

The small gain to be got by teaching the grammar of the mother-tongue to children under ten, even though they speak it fluently and accurately, is now realised. The desirability of training secondary-school pupils first of all to speak and read a modern language, and to introduce them to its grammar, step by step, but only after a considerable spoken control over it has been secured, is also now generally admitted: to ignore grammar altogether is a mistake. But the conversational approach to Latin is still the exception. The result in the case of many of its learners may be seen by reference to Pritchard's article.[1]

Euclid's formulation of the Elements of Geometry represents a highly critical and logical product. Fortunately, if now used at all, it is only after a prolonged manipulation by the pupil of geometrical models, figures and problems. This approach is, however, for some pupils often unduly shortened.

(*b*) The necessity for providing the pupil with plenty of material and plenty of opportunities for using it, before asking him to make generalisations concerning it, is now recognised. But in the case of some subjects, for example, French, it has not been sufficiently realised that although it is wrong to introduce its grammar except after a considerable period of oral practice in it, it is nevertheless most desirable that the teacher should have a thorough knowledge of it (as well as one or two others, for who knows grammar who knows that of only one language?); this will help him to make a scientific analysis of the language, and to select and arrange the types of sentences, etc., which he means to teach, and the order in which they are to be introduced; in other words, he must facilitate the work that will be done in the child's subconsciousness by organising the material before it is presented to him.[2] The later work of supervising the learner's formulation of its forms will thus be much simplified.

The material taught to the pupil in every subject should be put before him in an organised and graduated way, suitable of course for his power of apperception and control: he will not perhaps for some time be aware of its form. He must work at the subject long enough for that to present itself gradually to him. Most of the waste that is involved in the pursuit of certain subjects arises from the simple fact that they are pursued for too short a period.

(*c*) Many teachers are chary of calling their pupil's attention to the way in which the methods and ideals fostered in particular studies may be given a wider application. The teacher's duty in this respect has been expressed in Burt's Paper on "Formal Training: The Psychological Aspect." "Teachers should," he says, arrange the work of their pupils and their own mode of teaching so as to lead their pupils to recognise clearly the methods by which efficient work is done. Further, it follows that the intelligent child, who can perceive relations spontaneously, who can generalise his methods and re-apply them on his own initiative, is likely to show a wider transfer than the dull child. With the dull the teacher can hope to do little more than implant specific memories and specific habits that will be definitely useful in and for themselves, and, so far as possible, impress upon the child how these memories and these habits may subsequently be applied."[1] Nunn and Thompson add a note in which they express their agreement with Burt's view. It will, I think, be generally accepted.

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[1] R. A. PRITCHARD: "The Relative Popularity of Secondary School Subjects at Various Ages."—This *Journal*, V (1935), pp. 157-179, 229-241.

[2] See the present writer on: "The Subconsciousness and the Acquirement of a Second Language: the Conditions of most Effective Work."—*Forum of Education*, VIII (1930), pp. 135-142, 163-173.

(*d*) Work done by the pupil when his teacher has paid due regard to (*a*), (*b*), and (*c*) above, and continued for a sufficient length of time, has every chance of evoking his activity, arousing his interest and gradually giving him a feeling for the advantage to be derived from a careful arrangement of the matter to be dealt with, and of the necessity for constant repetition and application of every part of it. (Is there not an unreasonable reaction to-day against the advantage to be gained by memorising well-understood facts and formulae?) The principle or procedure which the pupil, by his own efforts and his teacher's guidance, elicits from a branch of study and the formulation he makes of it in set words will follow as a natural growth, and the satisfaction got from the whole course of the study will act as an incentive for applying similar effort and care to another subject: the big general tendencies described by Archer will begin to show themselves, and ideals, as they develop, will exert a growing influence on his character.

VII.

I have already quoted Thorndike's warning to those who over-estimate the degree in which instruction in a manual art or theoretical subject can affect another. It was, not so long ago, the fashion to make extravagant claims on behalf of woodwork, especially of that form of it called Sloyd. In the *Theory of Educational Sloyd*, it is explained that one of its so-called formative aims was "to train the eye and sense of form. To give a general dexterity of hand, and to develop touch."[2] Judd's treatment of the many differences inherent in the use of different tools demonstrates how specialised the process of gaining control over each skill is, and how slowly the general influence of the manual arts makes itself felt.[1] As to theoretical studies, I have of course assumed that every one of them may exercise an influence on another, but whether it is to be beneficial or not, depends on the manner in which it is pursued. The writer I have just referred to complains that " our text-books make boys and girls learn in such a way that there shall be a wall of division between arithmetic (for example) and everything else."[2] There is, he adds, " a general phase in every experience." " The effect of one experience on later life," he continues, " depends on the character of that experience and the way it is managed. We may make of our pupils eager seekers after truth, or we may make of them bigoted little dogmatists."[3] Angell in his paper on the " Doctrine of Formal Discipline in the Light of the Principles of General Psychology," says, " The implication of our deliberations would be that every study has latent in it the possibilities of becoming to some extent a formal or general discipline."[4] Ruger concludes that " the problem-consciousness would, from the standpoint of efficiency, be almost universal in scope and its general features or factors would serve as means for the transfer of an extensive sort."[5] But he reminds us of the distinction he had drawn between direct (or necessary) transfer and conditional transfer, and adds : " The statements . . . in reference to the wide possibility of transfer presuppose in the main . . . acts of analysis." We know, however, that such analyses are often very slow in their development.

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[1] Report of the British Association, 1930, (1931) p. 282.

[2] *Lectures of O. Salomon*. Revised and edited by an Inspector of Schools, 1892, p. 7.

Let us again consider the way in which Archer formulates the end to which training should be directed, viz., the development of big general tendencies. I quoted his declaration that mental habits are associated with the form and not with the content of thought. However, for the sake of the matter we are dealing with, it is still necessary to add that each habit has to be formed and practised in connection with the content of one or more particular studies. Educators in all ages over-estimate the ease with which, for example, logical reasoning can be trained by courses of study in algebra or geometry, or by a mastery of formal logic. Students, if they are to learn algebra and geometry, will require several years' manipulation of problems relating to them : even then, many will fail to secure more than a small grasp over them, and more will fail to gain an insight into the special value of the methods they illustrate, for the simple reason that the problems set them to solve possess little practical urgency. Yet nobody has a right to deny that if a pupil is capable of and can be brought to make a successful study of one or more branches of mathematics, a strong intelligent attachment to their methods may be developed: on the other hand, we also know that such a study long continued, unless balanced by others involving different types of reasoning, tends to make the student a slave to mathematical ways of arranging an argument. A variety of studies well managed is necessary in the formation of a general logical training.

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[1] C. H. JUDD : *Psychology of High School Subjects* (1915), pp. 255-7.

[2] C. H. JUDD : " The Relation of Special Training to General Intelligence.—*Educational Review*, XXXVI (1908), p. 41.

[3] *Ibid.*, p. 42.

[4] J. R. ANGELL.—*Educational Review*, XXXVI (1908), p. 14.

[5] H. A. RUGER.—Op. cit., p. 86.

The history of man shows however that the mathematical reasoner is not thereby necessarily made a more capable citizen than his neighbour who knows nothing of algebra and geometry. Likewise, it may happen that it is only when a historical student has made a long study of his subject, applied methods found peculiarly suitable for unravelling historical problems, and *felt* the difficulty of applying the inductive method to his examination of certain cruxes which he is anxious to solve, that he fully realises the value of formal logic.

No subject pursued in a secondary school or university has in it more possibilities of making clear its essential value as a method than experiment, and yet unless its characteristic demands and advantages are worked into the mind by long manipulation in at least one field, e.g., chemistry, its influence will remain of a restricted character. It will even then sometimes be difficult for the big general tendencies that are fostered in experimental enquiry to shake themselves free from the subject in which it was pursued, so as to make themselves operative, say, in physics, it will be more difficult for them to assert themselves in botany, and still more so in a study of the supply and demand of commodities. The mental habits trained in experimental chemistry are associated with the latter's own peculiar form, and if they are to exercise their fullest influence, they must at need be capable of being dissociated from it ; on the other hand, they will wither and die if the processes and facts learnt in it are forgotten. So that, while it is true that mental habits are logically associated with the form and not the content of thought, yet their efficiency will depend on the thoroughness with which the former has been evolved from the latter in one or more related domains, and the ease with which the special character of its embodiment in them can be recalled and re-used. Dewey points out that the abstract tends to become so aloof, so far away from application, as to be cut loose from practical and moral bearing : the gullibility of specialised scholars when out of their own lines is an extreme example of the bad effects of severing studies completely from their ordinary connections in life.[1] "Form" when unsupported by its special matter tends to become ineffective.

Educators are in constant danger of forgetting that man has not developed a single new form of thought by attendance at places of instruction; mathematics, for example, came into being because he felt a need for improving his old ways and discovering new ones for dealing with quantities and shapes. Arithmetic and geometry were only gradually but with many checks (consider the barrier set to the Romans' arithmetical progress by their system of notation), perfected. No mind is however likely to suffer from ignorance of the special nature of mathematical thinking, save if and when it finds a necessity to make use of arithmetical computation or graphical methods in statistics, etc., or when at a higher plane of thinking, it desires to take a philosophical view of the universe. On the other hand, so complicated is the structure of advanced mathematics that if a mastery of them before college days are over is demanded, an early introduction must be given to their simple forms and a knowledge of certain tables, formulæ and rules must early become almost automatic in its application. Part of the educator's difficult task in selecting subjects for his pupils lies here.

VIII.

To return to a consideration of the extent to which the influence of studies may spread, we note that two factors have created scepticism concerning the possibility of securing a wide development of it. One has already been referred to above; it arises out of the disappointment caused by the grievous failure of certain obligatory studies, especially when pursued for only short periods, to produce even a fair mastery over their data and methods. This failure is masked by the devotion of other students to them, and the undoubtedly genuine culture derived from the pursuance of them, when continued for a considerable length of time.

A second factor is not of recent origin, but the intensity with which it exerts its influence owes much to modern movements. I refer to the fact that the countless enquiries made into the nature and growth of intelligence have seemed to indicate that the upper limit of age at which its growth ceases is no higher than 16, though some believe that development probably continues till 17 or 18 in the case of superior individuals. But the difficulty every maker of intelligence tests has encountered in framing them so that they will measure native ability, with as little reference as possible to acquired experience, has shown that the influence of ordinary life and organised training enters into all our performances in a most pervasive way. " We must," says Wheeler, " accept the unwelcome conclusion, at least in a negative form, that there is no evidence from the use of mental tests to justify a belief that there is much (if any) growth of general intelligence in the average individual after about 16." But—" neither is there any evidence to suggest that there is any decline of native ability during maturity."[1] "Are there then," she asks, " no real developments in intellectual life during maturity ? " " To draw this conclusion," she answers, " from the limit to the growth of intelligence revealed by experiment would not only be to misinterpret the meaning of general intelligence, but also to misunderstand the essential nature of cognition."[1] She shows that the evidence concerning the 'maturing' of intelligence undoubtedly points to the conclusion that the three noegenetic functions distinguished by Spearman (or at any rate, the second and third of them) reach their highest point early, but retain it until late (in Spearman's opinion until about 80). "Age then," she adds, " does not appreciably diminish the fundamental cognitive powers ; but experience does greatly affect the application of these powers to particular cases."[2] She applies this consideration to illustrate how originality and creativeness of mind may increase long after 16 or 18 years of age. Finally, she calls attention to the fact that " the cognitive side of experience is never separated from, but is always interrelated with, the feeling and conative aspects. Any developments in the emotional life or in the customary activities of an individual may intensify his power of thought in particular directions."[3] A study of her complete argument will do much to remove the pessimism regarding human improvability that has been caused by certain dicta pronounced in the belief that it is impossible to increase native intelligence beyond a point reached round about a particular age.

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[1] J. DEWEY: *How We Think* (1910), p. 51.

IX.

(*a*) The importance of educating every person who has intelligence enough to profit by it, whatever his age may be, is I think clear. The methods too by which each subject should be taught have been fairly well established. Can we next arrive at a general agreement on the matters to which preference must be given in our secondary schools, for as to the kind of instruction to be given in our elementary schools we are fairly unanimous. I submit that each subject must be selected for its intrinsic worth, and in estimating it, we shall not take account, either in part or in the main, of the type of thinking it produces. Once however we have decided to include it in a pupil's scheme of work, we shall take the greatest pains to present it as clearly as possible and so that the learner in pursuing it can gain that delight in it and mastery over it, that strengthening of thinking which it particularly exercises, and that outlook on the world which it is its prerogative to supply. Also, we shall strive to gain the advantage that can be got from a due regard to the principle known as the " Correlation of Studies."

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[1] OLIVE A. WHEELER : *Creative Education and the Future*, 1936, p. 161.
[2] *Ibid.*, p. 162.
[3] *Ibid.*, p. 163.

The suggestion however that similarity of material in two subjects justifies the compulsory introduction of both into the curriculum, although one of them may soon be given up, is sometimes put forward. Especially is this the case in regard to Latin. Without some knowledge of it, we are told, no proper understanding of the English language is possible. This argument has an odd sound in the mouths of those who continue to teach Latin through English and present no Latin word or phrase without translating it into the mother-tongue ! I grant of course that Latin may be so taught as to give the learner a delightful insight into the origin of many English words. To admit this however is quite a different matter from assenting to the assertion that a language cannot be learnt by using it by itself. Plato possessed an enviable control over Greek, although he knew no other language. But we need not labour the point. Some of the greatest masters and mistresses of English prose and verse knew no other tongue.

It may however be maintained that the dependence of English on Latin is so intimate as to make that a serious auxiliary consideration in favour of teaching the latter. No one has so far tried to justify teaching it on that ground alone, but when one points out how little ability in reading Latin most secondary-school pupils possess at 16 or 17, one is offered the cold comfort that they have at least learnt the Latin derivations of many English words. I maintain that the only justification for studying Latin is in order to gain the ability to read and understand it, and in that way to get an insight into the life and thought of certain parts of Europe during many centuries. But a full and correct control of English can only be got by much use of its own spoken and written forms under trained direction : if however a knowledge of the derivation of its words is required, that can only be got by a study of Latin, Old French, etc.

It is essential for our pupils to secure a sure control of English, but an acquaintance with its etymology is not. Yet various auxiliary arguments of the kind we have discussed have enabled the advocates of Latin to retain it in the favoured place it still occupies in many places. As I mentioned in a recent number of this *Journal*,[1] over 2,000 pupils in

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[1] This *Journal*, VII (February, 1937), p. 90.

Welsh secondary schools take Latin every year in the First School Leaving Examination. But only one-tenth of them pursue it to the next stage ! Educational theory is not so bankrupt as not to be able to suggest a more profitable employment of our scholars' time. The position is even more deplorable when we remember that Pritchard's enquiry showed that Latin is, in the English schools he got returns from, the most unpopular subject for boys and with the exception of geometry for girls. Not only does four and five years' study of it produce little fruit, but for many it makes all school memories unpleasant. A similar misapplication of the principle, "Correlation of Studies," has been made in respect of some other subjects.

(*b*) Having now considered some of the main considerations that ought to guide us in settling the contents of our curricula, and suggested why certain arguments advanced in favour of giving some subjects a special place in them are scarcely valid, we can proceed to consider the special needs of those schools that are generally called "secondary" (the Hadow Committee's recommendation in favour of retaining the name "Grammar School" was, I suggest, most unfortunate). The list of subjects that demand close attention from us is, if our pupils are to help their country in meeting modern conditions, formidable.

I venture to submit the following list, putting the most urgent first.

A.—(1) Spoken and written English, including a broad knowledge of English verse, prose and drama. (Welsh-speaking pupils should in addition make a like study of their mother-tongue.)

(2) Vocal and/or Instrumental Music. Is there a sufficient reason why any scholar should leave school at 17 without being able to read or play simple music, just as he reads a book at 11 ?

(3) Drawing, with a knowledge of and an appreciation of the main forms of Art.

(4) Simple Arithmetic.

(5) Geography. I should be prepared to make room for a considerable study of Geology in some Geography schemes.

(6) History. Unfortunately this subject is too often taught in an unprofitable way.

B.—(7) Algebra.

(8) Geometry and Trigonometry. In view of the increasing use that is in certain professions made of statistics, it might be advisable, in the case of some pupils, to reduce the amount of theoretical geometry attempted and devote the time thus saved to a study of various statistical methods, including graphs, etc. Speaking generally, attention to both B.7 and 8 is becoming more and more necessary.

(9) Physics.
(10) Chemistry.
(11) Biology.
C.—(12) A sound control of the Speaking and Reading of one (or, in special cases, two) modern languages.
(13) Latin and/or Greek.

When we bear in mind the necessity for fitting a youth to fill his place in a highly-complex modern community, and that this must include training some of at least of his æsthetic tendencies, although their concrete expressions may not have a direct utilitarian value, it becomes clear that certain important and time-honoured subjects must be omitted from many schemes, not because suitable methods of teaching them have not been evolved, and not because, when their study is continued for six or seven years, they do not clearly contribute to a sound education, but simply because the demands of world affairs to-day are so many and so insistent, that unless they are satisfied, our country's fate is bound to become increasingly gloomy.

It is difficult to admit that every child should not study each of the six subjects included in Section A, and few boys and not many girls will omit two out of the three topics named in B.9, 10 and 11, and, as already said, it is essential that some devote a great deal of attention to B.7 and/or 8. If the contention already advanced by me is well founded, viz.: that the custom sometimes followed of dropping some of these subjects at the end of two or three years is uneducational, it will at once be realised that a curriculum which includes all topics comprised in A and several of those in B will tend to be heavy. Can we, in that case, find room for a foreign language? Can we include two? Before offering any reply to these questions, I should like to make a brief reference (*a*) to the need for a more general differentiation in the languages taught in schools situated in the same district, and (*b*) to the desirability of giving a bigger place to certain European languages, such as Russian, Italian, etc. But to return to the previous question, it is clear that by confining attention to only one modern language, a more complete mastery of its literature and of its spoken form will be attainable, and the chance of that mastery leading to a permanent employment of it is increased. It can hardly be the function of a secondary school to give the student a training in advanced composition. It is conversational power that will, in most cases, prove the most lasting and stimulating factor. For some pupils, a considerable power of speaking a second language can also be given. Where then can room be found for Latin or Greek? In view of the recent publication[1] of a critical examination of the place the former should occupy in our schools, no detailed consideration of the matter is needed from me. But to prevent any possible misapprehension, I should like to say that *if* it is possible to give a pupil by the time he or she leaves school at 17 or 18, such a command over either of these languages (and it is probably more difficult to do so in regard to Latin than to Greek), as to enable the learner to continue reading it when schooldays are over, cultural effects, as valuable as those to be got from French or German, will have been produced. The difficulty of securing such a command is however very great. But the need for a sound knowledge of at least one modern language on the part of many more educated persons than do at present possess it, is, so it seems to me, more urgent than a knowledge of Greek or Latin. I suggest, therefore, that neither of the classical languages be made compulsory in any secondary school, or in any matriculation examination, and that the use of many scholarships now awarded for proficiency in them should be reconsidered. If, as a result, the size of the Latin class were reduced and admission to it granted only to pupils of proved intellectual ability, many of the complaints now raised against the unprofitable nature of the study made by many students of it in secondary schools would be removed. The possibility too, if the class were confined to about twenty pupils, of making more use of the Direct Method, in a pure or diluted form, would be increased, and thus greater interest added to the work.

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[1] C. W. VALENTINE: *Latin: its Place and Value in Education* (1935).

D.—The necessity for reducing the number of subjects taken up by some pupils becomes greater if and when it is found advisable for them to study one or more of the topics which we may include to form Section D, namely, Domestic Science, Woodwork, Metalwork, Needlework, Cookery, Hygiene, Agriculture, Horticulture, Shorthand and Typewriting. Though much time and attention will of course be given to Physical Exercises and Organised Games, I hope the work will not harden into a "subject."

Finally, such universities and places of higher learning as require a knowledge of other subjects as preliminaries to entrance upon certain courses, might themselves reasonably be asked to provide preparatory instruction in them.

If pupils were encouraged to enter secondary schools at 11, or a little earlier, and to remain in them until they were at least 17, and a scheme of study provided for them which assumed that no subject would be dropped (except in special cases of failure to progress) at the end of only two or three years, the influence of every study in its specific and general aspects would be more often realised than is now the case ; the meaning of certain great ideas, principles and ideals, together with the gradual acceptance of the latter, would be developed in a more intense because less hurried manner; and if, furthermore, the schools continued to exercise the socialising influence which they already exert, their pupils would be better prepared than ever before to develop their own individuality, to contribute to the needs of the society to which they belong, and to make this contribution in such a way as to add to the welfare of mankind.

X.—CONCLUSIONS.

1.—The pursuit of a study produces results which, strictly speaking, are inseparably interwoven, yet they may for convenience sake be divided into two broad classes; the one may be called specific and consists of a familiarity with and a taste (or distaste) for the data and particular methods employed in it: the other, which may be called general, consists (*a*) of a subconscious or conscious recognition of the fact that the study possesses a certain 'form,' and (*b*) of a development of the tendency towards (or against) applying it to other studies.

2.—The educator needs a term to describe the general effect(s) which a course of training in one or more fields exercises upon a subsequent operation, firstly when the person concerned is not aware of the reason or the way in which he is, in doing the latter, affected by the previous training, and secondly when he realises that the method adopted in the training course can be applied to a later task. The term 'spread of training' is suitable as a description of the first and second cases, and 'transfer' of the second. I have put forward reasons for retaining the term 'transfer' and for restricting its use to the latter case. I do not consider it desirable to include an application of the data found in one field to another under 'transfer.'

3.—The difficulty of securing such a transfer of power from one subject to another in our secondary schools is, for reasons familiar to all educators, great, but is increased (*a*) by the specially favoured, and often compulsory, place assigned to certain traditional studies, especially Latin, and (*b*) by the fact that since modern civilisation necessarily demands a close acquaintance with many subjects, too many are included in the individual pupil's scheme and the length of time during which several, and indeed all subjects included in it, are studied is too short. The greatest single obstacle at present to a more efficient secondary education is, for a large proportion of pupils, the predominant place given to Latin, for others, mathematics.

4.—A realisation of the nature of certain methods and a feeling for their value, likewise an acceptance of the demands of certain ideals, can only arise out of an intensive and long-continued application to a particular subject or subjects in which they are employed, or out of which they emerge. Educators are probably inclined to overlook the fact that the degree to which the general influence of studies can make itself continuously and actively felt depends on a considerable retention of the contents and methods of the one(s) which the person concerned has once mastered.

5.—From the subjects of which a knowledge is required by modern conditions such a selection can be made (the only ground of choice being a subject's intrinsic value) as to prevent any single study, or group of studies, from exercising a preponderant influence on the mind, and so giving it a one-sided tendency.

6.—Pessimism regarding the extent to which the human mind is improvable has been felt by some educators in all ages, but has been much deepened by certain conclusions that have been based on the results of intelligence tests applied during this century. There is no adequate cause for giving way to the recent form of it.

7.—I have attempted to apply the principles discussed in this article to the secondary school curriculum, and put forward a suggestion to give preference (A) to (1) English, (2) Music, (3) Drawing, (4) Arithmetic, (5) Geography, (6) History; (B) to (7) Algebra, and/or (8) Geometry, (9) Physics and/or (10) Chemistry, and/or (11) Biology; (C) to (12) one, and in special cases, two modern languages, especially to Speaking and Reading them; (13) the study of Latin and/or Greek should only find a place under special conditions. The difficulty of deciding which of these subjects to include and which to exclude is increased by the necessity for giving impartial consideration to the claims of others like Domestic Science, Agriculture, etc. Time must also be found for Physical Training and Games, as well as the other communal activities of a school.

RÉSUMÉ.

LES INFLUENCES GÉNÉRALES DE L'ÉTUDE DES DIFFÉRENTES BRANCHES.

Les influences exercées par l'étude des différentes branches sont inextricablement emmêlées, mais on peut, puisque c'est plus commode, les diviser en deux classes : l'une " spécifique " consiste en une connaissance de, et un intérêt à, ces branches ; l'autre " générale " en une réalisation, en partie ou entièrement consciente, du fait que quelquesunes entre elles ont la même " forme," ce qui peut conduire à l'emploi des mêmes méthodes en les traitant. L'on considère, et rejette, des raisons, avancées quelquefois, pour attribuer cette influence " générale " à l'existence d'éléments objectifs (ou subjectifs) identiques. L'on soutient l'emploi du terme

" transfer of training." L'on examine les facteurs qui favorisent le développement d'influences " générales " avantageuses dans une liaison étroite et prolongée avec des influences " spécifiques " définies, par rapport à des plans d'études convenant à des éleves qui doivent quitter l'école secondaire à dix-huit ans.

ZUSAMMENFASSUNG.

DER ALLGEMEINE EINFLUSS VON STUDIEN.

Die von Studien ausgeübten Einflüsse sind untrennbar ineinander verwoben, aber aus Zweckmässigkeitsgründen kann man sie in zwei Gattungen teilen: die eine, " spezifische," besteht aus Vertrautheit und Interesse; die andere, " allgemeine," besteht aus einer zum Teil oder vollends bewussten Anerkennung, dass das Studium oft dieselbe " Form " hat; dies kann zur Aufnahme derselben Methoden führen, wenn man sich mit Studien befasst. Die Gründe, die man oft angibt, wenn man diesen " allgemeinen " Einfluss dem Vorhandensein " identischer objektiver (oder subjektiver) Elemente " beimisst, werden in Betracht gezogen und abgelehnt. Der Gebrauch des Ausdrucks " Formaldisziplin " wird verteidigt. Die Faktoren, die der Entwicklung nützlicher " allgemeiner " Einflüsse günstig sind, lange eng verbunden mit bestimmten " spezifischen " Einflüssen, werden mit Bezug auf Lehrpläne für Kinder, die die höhere Schule mit 18 Jahren verlassen, in Betracht gezogen.

CONTRIBUTIONS CONCERNING MENTAL INHERITANCE

I—Of Intelligence.

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(from the Institute of Educational Research, Columbia University).

I.—*Introduction.*
II.—*Plan of enquiry.*
III.—*Correlations of mid-parent and mid-child.*
IV.—*Investigation of other relationships.*
V.—*Discussion.*
VI.—*Summary of results and conclusions.*

I.—Introduction.

By reason of its significance for the understanding of individual personality but even more because of its important social bearings, the question as to the precise extent of inheritance of mental characters has been attacked with renewed interest in recent years. Though the inheritance of mental capacity has been longer studied than have the genetic aspects of temperament and character it is still far from being understood. Our purpose is to add a further contribution to the data on mental capacity before passing on to the relatively untouched field concerning inheritance of temperament-character.

In the past the problem has been approached through studies of the constancy of the I.Q. and the variability of the I.Q. under diverse home and school conditions, through comparisons of the correlations of intelligence among siblings, fraternal twins and identical twins, and by assessments of the correlations of I.Q. among parents and children.

No attempt will be made here to review or evaluate this past work[1] in any comprehensive fashion: our intention is rather to bring forward fresh facts from an angle which has not yet been explored in this country.[2]

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[1] This has already been done by Schwesinger in " Heredity and Environment " up to 1929 and less comprehensively by the present writer in Chapter III of " The Fight for Our National Intelligence," up to 1937. See also " The Relation of Intelligence to Varying Birth-rate in different Social Grades," by E. J. G. Bradford in this Journal, Vol. VII, November, 1937.

[2] There are, however, three American studies in which both parents and one or more children were assessed. In one of these the assessments were not based on actual tests. In another only fifty families were included. The remaining enquiry, that of H. E. Jones (see p. 136 below) used the first Standard Binet test, which could scarcely be considered suitable for this purpose.

Nevertheless some comment on method is necessary. There has been misunderstanding and recrimination unworthy of scientific discussions, arising from couching the arguments in the old " Heredity *versus* Environment " mould, without any attempt to define, quantitatively or otherwise, the amount of environmental variation for which a certain " weighting " respectively of heredity and environmental influence holds true. Obviously in an environment such as the surface of the sun hereditary differences in human intelligence would amount to nothing. Within the ranges of nutrition, culture, incidence of disease and educational opportunity existing between the most primitive and the most highly civilised people known to anthropologists, it is probable that severe environmental conditions account for many failures of intelligence development. Within the range of nutritional adequacy and educational stimulus at present existing in Great Britain, on the other hand, it seems reasonable to argue that the greater part of intelligence variation is determined by genetic factors.[1]

In short, each statement on heredity and environment should be qualified by a measure of environmental variation. Nor should such a statement be taken to pre-suppose that the relation between environmental variation and environmental influence is a linear one. It would appear, for example, that wide variations of nutrition have little or no influence on intelligence development, until that variation reaches the margins of actual starvation.[2]

Obscurities of statement have arisen also from failure to distinguish between what is innate or congenital and what is inherited, or even from such gross misinterpretations as supposing that the inheritance of mental capacity implies the inheritance of the actual reactions invoked in intelligence tests.

Of the various possible approaches to the problem of genetic factors in intelligence the most neglected seems to be that of directly comparing the intelligence of parents and children, indeed, as stated above, there is as yet scarcely a single satisfactory research on the matter. Partial studies, as of father-son or mother-daughter relationship, are more easily to be found. One reason for this deficiency of records of whole families seems to be the absence of a suitably designed and standardized adult intelligence test. The present writers began their research when the Cattell Scale III test was standardized in 1930.[3] The slowness with which results accumulated soon caused them to realize that the main cause of neglect of this most necessary approach to the problem of heredity lies in the social difficulty of obtaining whole families, of a normal and typical kind, willing to undergo a thorough mental testing. However, by testing whenever a suitable personal contact was made, and by making opportunities for contacts whenever possible, rather more than one hundred families were tested in the ensuing six years.

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[1] CATTELL, R. B.: Chapter III, " The Fight for Our National Intelligence." London, 1937.

[2] CATTELL, R. B.: *Loc. cit.*

[3] The standardization was not published in full until 1934 in " Occupational Norms of Intelligence and the Standardization of an Adult Intelligence Test." —*Brit. J. Psychol.*, XXV, 1.

From the beginning the testing naturally had to be planned with due regard to the kind of analysis which we proposed to carry out on the resulting data. Though it is attractive to think that an analysis for Mendelian factors might be made, as Hurst did so interestingly but prematurely on merely estimated intelligence, we felt that the accuracy of intelligence tests does not yet justify any attempt to split up the observed continuous variation of mental capacity into discrete steps such as might be expected to occur from the separate additive effects of independent gene factors.[1] With intelligence as with stature no one has yet succeeded in demonstrating any step-like formation in the normal distribution curve, probably owing to the large number of gene factors involved and the tendency of slight environmentally-caused variations to smooth out the diminutive steps in the curve.

Our plan was therefore not to aim at any Mendelian analysis, but to arrive at a more accurate figure for the correlation to be expected in a normally distributed population between mid-parent and mid-child. We also hoped to contribute to the stabilizing of correlations for other relations in the family and to obtain means and variabilities which would permit one to predict the probable average intelligence and the variation of intelligence among children of parents or parental groups of known intelligence.

II.—PLAN OF ENQUIRY.

We decided to record measurements on approximately one hundred families, observing the following conditions :

(1) That families grossly defective or anomalous in educational background should be avoided.

(2) That the intelligence test should be given individually and be adapted in each case to the age and educational background of the individual.

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[1] HURST, C. C. : "A Genetical Formula for the Inheritance of Intelligence in Man."—*Proc. Roy. Soc.*, London 112B, 80-97, supposed ten steps determined by six gene factors.

(3) That all children in the family should be tested and that families with only one child should be avoided if alternatives could be found.

(4) That the families should be selected to scatter evenly over the range of intelligence existing in this country, i.e., not be confined only to professional workers or some other highly selected group.

In the interests of (2) we used a series of tests, the Cattell Scales 0, I, II, and III; Scale 0 being applied to children of 4 to 8 years, Scale I to those of 8–11 years, Scale II to children of 11–15 and the less intelligent adults, and Scale III to superior adults and youths at the universities. The standardization of these scales has been described elsewhere.[1] It is such that the testing of the same individual by different (but adjacent scales gives essentially the same I.Q. value, in so far as the scales are appropriate to his mental age, and within the limits of experimental error. The standard deviation on all these scales is, however, greater than that commonly found for the Binet test or its revisions, being approximately 27·0. Reasons for considering that this is more likely to represent the real scatter of intelligence have been set out elsewhere[2] and have been debated by Vernon.[3]

Scales 0 and I are non-verbal and require no writing. Consequently Scale I was used in testing duller adults (i.e., those likely to fall in the 8–11 year mental age range) especially when there was any suggestion of defective verbal education or experience, and in one instance Scale 0 was used for the mother of a child in the special school. Scales II and III are partly verbal partly non-verbal.

Aim (4) was by no means realized. Towards the end of the investigation it became obvious that in spite of efforts to the contrary we were getting a preponderance of families of professional status. Even the families obtained through the W.E.A. and similar organizations claiming to cater for the average man, proved to be selected for good intelligence. To compensate for this drift towards high average intelligence we finally decided to approach a number of parents of children in classes for the dull, and we also availed ourselves of the good rapport existing with parents of children brought to the School Psychological Clinic at Leicester. We are also indebted to Sister Mary of the Notre Dame Child Guidance Clinic for a few completely tested families. These difficulties of selection are described as an indication to others who may be contemplating similar research. The outcome of our attempt at compensation was that we reduced the average of our results approximately to that of the general population, but found when the distribution curve was plotted that it had two peaks, as shown below.

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[1] CATTELL, R. B.: "Standardization of Two Intelligence Tests for Children."—*Brit. J. Psychol.*, XXVI, 3, 1936; and

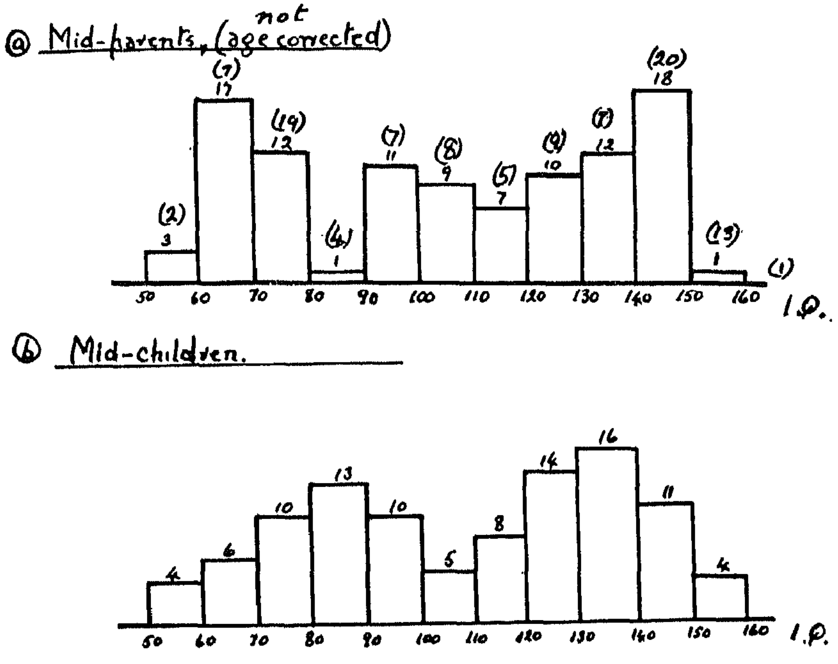
CATTELL, R. B.: "Occupational Norms of Intelligence and the Standardization of an Adult Intelligence Test."—*Brit. J. Psychol.*, XXV, I, 1934.

[2] CATTELL, R. B.: "A Guide to Mental Testing."—Univ. of London Press, 1936, p. 7.

CATTELL, R. B.: "The Fight for Our National Intelligence."—P. S. King, 1937, p. 12.

[3] VERNON, P. E.: "Measurement versus Intuition in Applied Psychology. Character and Personality."—November, 1937.

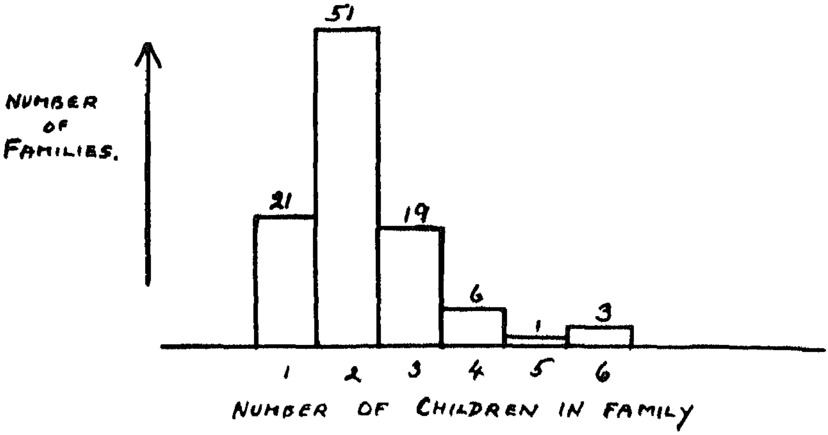
DIAGRAM I. DISTRIBUTION OF I.Q.'s.



One may notice incidentally from this diagram the clear tendency for the children to regress towards the mean, in relation to their parents. The standard deviation of the children is 29·1, and for the parents 31·6. Both are above that found in a normal population, as one might expect from the shape of the histogram, and will need to be subjected to correction in obtaining correlations applicable to the normal population.

The following histogram shows the extent to which we were able to fulfil the plan of obtaining families with more than one child.

DIAGRAM II. SIZES OF FAMILIES INCLUDED.



After rejecting four families of one child size which were also unsatisfactory for other reasons, such as the extreme youngness of the child, or the tendency of the parents to add to the glut of high intelligences, we were left with 101 families for the subsequent analyses.

III.—CORRELATIONS OF MID-PARENT AND MID-CHILD.

Preliminary researches have shown that there is a decline in performance on intelligence tests with age after the age of about 25–30. This might be due to a variation, with age and the spread of interests, of the amount of *g* and *s* in the tests used, but that is unlikely since the effect is quite marked in verbal tests involving a verbal *s* in which one would expect mental ability to become increasingly invested as life proceeds. Some recent American results[1] indicate that if sufficient time is allowed to the older people no appreciable decline of performance ensues. Without prejudice to the question as to whether there is a real decline of intelligence, or whether speed and *g* can be thus separated in older people, we decided to apply a correction for age to the individual scores of the parents, bringing each to the score that he would have had at his prime. The magnitude of this correction was worked out from results found in my earlier survey of intelligence variation with age in certain uniform occupations, together with observations on the mean difference between parents and children in the present data, when parents are arranged in age groups. The ultimate correction was applied from a curve, the points of which were +2 points of I.Q. at 35 years of age, +4 at 45, +8 at 55, and +14 at 65. This tends if anything to understate the size of the correction indicated by the raw results.

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[1] LORGE, I.: "The Influence of the Test upon the Nature of Mental Decline as a Function of Age."—*J. of Educ. Psychol.*, February, 1936.

Without some correction for age the child-parent correlations would obviously be false, for the range of age of the parents was large. We have, however, worked out the correlation also on the uncorrected score : (1) to see what the uncorrected figure would be, (2) to see if the correction carries the correlation in the expected direction, and (3) to make certain that the correction produced no exaggerated effect on the whole order of magnitude of the correlation obtained.

Although in this section we are concerned to obtain only one correlation—that of the mid-parent (i.e., the mean of each pair of parents) with the mid-child (the mean of the children)—the possibility of various corrections and methods of calculation will present us with so many diverse coefficients that confusion is likely to arise unless they are systematicaly set out. Thus, in addition to the effect of the above age correction we have to consider the result of a simple means of reducing the influence of the unusual scatter in our data, namely by re-scaling the data to a normal distribution. For this re-scaling the I.Q. scores of the mid-parents and the mid-children were arranged in seven successive categories, having values from —3 to +3 and containing 2, 10, 23, 31, 23, 10 and 2 cases in the successive categories, these numbers representing the nearest approach to the terms of the binomial expansion to fit 101 cases. The correlations obtained by these alternative processes are shown below.

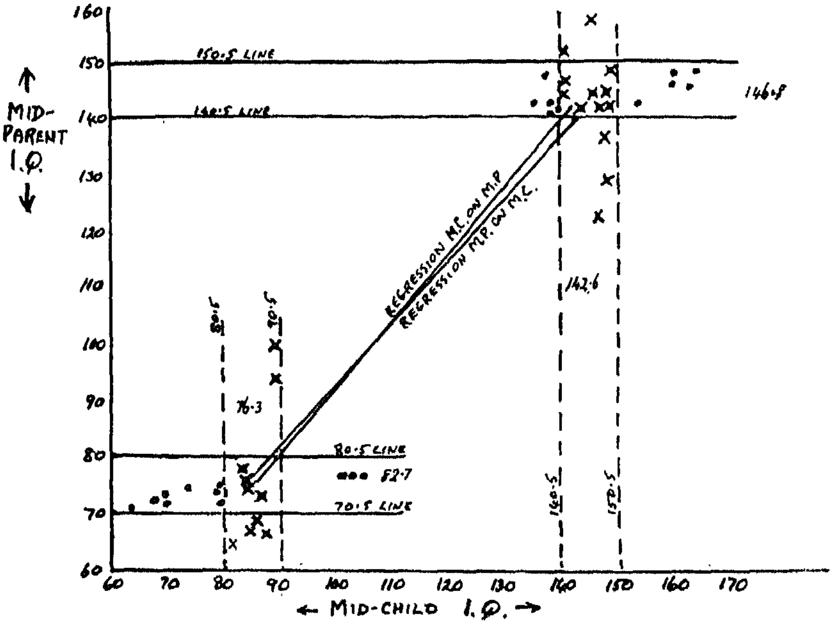
TABLE I.

CORRELATIONS OF MID-PARENT AND MID-CHILD. 101 CASES.

Before Age Correction.		*After Age Correction.*	
On I.Q.'s (Bravais-Pearson)	*On Re-scaled values.*	*On I.Q.'s (Bravais-Pearson).*	*On Re-scaled values.*
$r=0{\cdot}70\pm0{\cdot}048$	$r=0{\cdot}70\pm0{\cdot}048$	$r=0{\cdot}91\pm0{\cdot}028$	$r=0{\cdot}73\pm0{\cdot}046$

The age correction raises the correlation somewhat, as we should expect, for the decline of the parents from their characteristic I.Q. level would constitute a randomly distributed error calculated to reduce the correlation coefficient by attenuation. Nevertheless, it introduces no startling change into the results, for the general order of the correlation coefficient is not changed.

Although, as stated at the outset, we have no intention in this first article of relating our findings systematically to earlier results, it is interesting to note that the mean of these coefficients is practically the same as that of the two previous researches on an adequate basis.[1] But the coefficient on which we propose to put most weight—that obtained from age corrected results not artificially re-scaled to normality—will be considered surprisingly high by those familiar with earlier work, and for that reason it has seemed worth while to set out here in addition to the coefficient a section of the actual scatter diagram from which it is derived. This is built up from the two columns and the two rows containing most cases and, as will be seen from the regression lines, the correlation on this portion alone would actually be decidedly higher than 0·91. This figure, of course, is not to be accepted as our final one, for, as the distribution diagrams show, we are dealing with an unduly and abnormally



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[1] Jones, H. E. (1928): 27th Year-book of the National Society for the Study of Education, Part I; and

Outhit, M. C. (1933): "A Study of the Resemblance of Parents and Children in General Intelligence."—*Arch. Pschol.*, No. 149.

scattered population, such as is bound to give an inflation of the real coefficient.

In a moment we shall attempt a systematic elimination of the correlation error produced by this scatter, but in the meantime we ought to investigate the changes produced in the present correlations, taking account of the increased accuracy likely to result from increasing the number of children included in the figure for the average intelligence of the children in a given family. For the expression " mid-child " is scarcely accurate in regard to the above correlations, since, as diagram II shows, a number of one-child families are included in our results. Omitting these 21 cases and correlating for all families with two children or more with I.Q.'s re-scaled to normality, we obtain the following results :

Mid-parent, mid-child correlation, families of two or more children

$$r=0{\cdot}74 \pm 0{\cdot}051$$

Repeating for families of three or more children, we obtain

$$r=0{\cdot}73 \pm 0{\cdot}085$$

There is thus no significant increase, but the P.E.'s are such (the last coefficient being on only 29 cases) that the possibility of a slight increase of correlation through this procedure is not ruled out. On the other hand this lack of difference permits us to proceed to further correlations on the full 101 cases, with the knowledge that the intelligences of the only children happen to be such as to involve little error in the assumption that they would be representative of the intelligence of the mid-children if the familires had been " finished " or more extended.

A consideration of the lack of normality in the I.Q. distribution of our families shows that it can be compensated for in the correlation in two ways : (1) Since the histogram shows the distribution to consist of two almost equal and symmetrical separate normal distributions, we can, by cutting between the 50th and 51st cases, obtain two distributions, from each of which a correlation can be obtained under ideal conditions. These correlations can then be corrected for the deficiency of scatter in each section, relative to the variability in the normal population ; (2) The correlation coefficient for the full 101 cases may be similarly corrected directly for its excessive scatter. As before, we will try both methods and compare the results.

Formulae so far proposed for calculating the change in the correlation coefficient resulting from changes in population range are not entirely satisfactory from the standpoint of statistical theory. They assume, like Kelley's formula[1] that response errors are uncorrelated, or like Pearson's formula that defective scatter is due to insufficient sampling. Pearson's formula,[1] however, seems to offer the most reliable tool for our purpose.

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[1] KELLEY, T. S. : " Statistical Method," p. 222.

Before the calculation can be made we have to decide what is the real standard deviation of I.Q. in the general population. With the principal test used for children the present writer has obtained,[2] on a population of 3,734 children, selected with great care to be representative of the total population, a standard deviation of 21·9 among city children, and 36·9 among rural children. With the test for adults a balanced sample of 1,039 persons from various occupants yielded a standard deviation of 27·5.[3]

The present-day British population is divided between urban and rural areas in the proportion of roughly 4 to 1. A precise statistical combination of these data is not possible, because the rural mean differed from the urban mean, but it would seem reasonable to conclude that 27·0 may be taken as a good approximation to the standard deviation of the general population on these tests.

In the ensuing calculation, however, we are concerned, not with the standard deviation of individuals, but of pairs of individuals—mid-parents and mid-children. It was therefore necessary first to calculate the standard deviation of mid-parents in the general population, taking account of the fact that there will be some correlation of the intelligence of husbands and wives.[4] On the correlations of husbands and wives and of siblings which we had obtained at that time the mid-pair standard deviations for the general population were for mid-parents 25·8 and mid-children 23.5. The actual standard deviations in our abnormally scattered material were: mid-parents 32·7; mid-children 28·9. Substituting these values in the Pearson equation to correct the 0·91 value for the undue scatter, we obtain a correlation co-efficient of:

Mid-parent and mid-child in the general population
$r=0{\cdot}775$

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[1] PEARSON, K. (1908): "On the Influence of Double Selection on the Variation and Correlation of Two Characters."—*Biometrika* VI, in which the formula is as follows:

$R_{12}=r_{12}\frac{t_1\, t_2}{\sqrt{1-r_{12}^2\,(1-t_1^2)}\ \sqrt{1-r_{12}^2\,(1-t_2^2)}}$ where t is the ratio of the new to the old σ. This equation is not symmetrical with respect to R and r, so that r has to be obtained from a bi-quadratic equation (R being the known 'selected-coefficient' directly available from our results).

[2] CATTELL, R. B.: "The Fight for Our National Intelligence," p. 10.

[3] CATTELL, R. B.: "Standardization of an Adult Intelligence Test," etc.—*Brit. J. Psychol.*, XXV, 1934.

[4] By means of the formula $\sigma_{M-F}=\frac{\sqrt{\sigma_M^2+\sigma_F^2-2r\,\sigma_M\,\sigma_F}}{2}$

Because of the interest which attaches to retaining in parallel the results from the data before age correction was applied, we have worked out also the transformation which would ensue in the raw correlation if corrected to a normal standard deviation. It would be reduced to 0·54.

The alternative method of arriving at the true coefficient is, since our distribution happens to fall naturally into two distinct curves, to cut the distribution into these separate normal distributions, calculate the standard deviation and the correlation coefficient for each, and correct each coefficient for the defective scatter of the half to which it belongs, relative to that of the normal English population. For the upper 51 cases the standard deviation of mid-parents was 11·7 and of mid-children 13·9, whilst the raw correlation was 0·41. For the lower group of 50 cases the standard deviation of mid-parents was 15·6 and of mid-children 16·9, whilst the raw correlation was 0·81.

When corrected to the standard deviation obtaining in the general population these mid-parent-mid-child correlation coefficients become for the upper group, 0·82 ; the lower group, 0·94.

Our final figure for parent-child correlation would seem to be most fairly arrived at by averaging these three coefficients, for the last two, though based on fewer cases than the first, are derived from more typically normal distributions—a fact which justifies their having equal consideration.[1] The averaging has been carried out through the mediation of Fisher's z function of correlation coefficients, which, as is well known, provides a more accurate means of averaging correlation coefficients, having regard to the fact that their probable errors cannot be normally distributed. In this way the final figure for the correlation of intelligence of mid-parent and mid-child becomes 0·864 ±0·027. This is the figure given by the tests as they stand, but remembering that the consistency coefficient[2] of these tests is about 0·95, and correcting for attenuation accordingly, we conclude that the real correlation is most likely to be 0·91 ±0·028.

IV.—INVESTIGATION OF OTHER RELATIONSHIPS.

Though the above correlation is of most practical importance it is of interest to obtain from our data also the remaining possible correlations between various family positions. This procedure has the further value that it sets the main correlation in a reference framework of conditioning correlations, so that comparisons of the present results with those of any other research may be more fully understood in the light of these associated correlations. Thus, for example, one would expect the parent-child correlation to be lower in a community having, through different social habits and less definite organization, a less marked assortative mating than that revealed by the substantial correlation of intelligence of husband and wife appearing in this research. The reduction of correlation would not, of course, be in the main or perhaps even at all, due to any genetic effect from the disparateness of the parents, but would be a consequence of the reduction of variability of mid-parental I.Q's with less assortative mating in a population of initially the same individual variability.

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[1] Pearson's formula for selection, however, does not presuppose or require a normal distribution in the " selected " population.

[2] CATTELL, R. B. (1936) : " Standardization of Two Intelligence Tests for Children."—*Brit. J. Psychol.*, XXVI.

In addition to working out this background of intra-familial intelligence relationships we shall attempt in this section to obtain a preliminary answer to the question as to whether large differences of intelligence between mother and father have any effect upon the variability of intelligence among the children; for it is from the solution of such questions that light will eventually be thrown upon the manner of Mendelian inheritance or potential intelligence.

Of the intra-familial correlations we will first take that of husband and wife, which works out as follows:

	Raw Correlation.	*Correlation corrected to normal standard Deviation.*
For the whole group (101 cases)	0·84	0·713
For the upper normally distributed group (51)	0·26	0·748
For the lower normally distributed group (50)	0·66	0·833
Mean correlation coefficient (calculated from z functions) = ...	0·770 ± 0·043	
Corrected for attenuation = ...	0·811 ± 0·039	

Evidently there is a high degree of assortative mating in the population concerned; indeed, this figure is higher than those obtained by Pearson for correlation of physical characters in husbands and wives.

Our next task was to work out the correlation between the intelligence of a child and one of its parents only. Since past work indicates no sex linked inheritance such as might lead to a different correlation between father and son from that of father and daughter, we did not segregate results according to the sex of the child, but took the first child in each family, for if there is any difference in the accuracy of the intelligence testing, it is likely to be in favour of older children, who are more accustomed to the test situation. The correlation of the intelligence of the first born on the full 101 families was 0·84 with the mother and 0·93 with the father. As the standard deviation of the parents was, as already demonstrated, decidedly above that of the general adult population, being 33·3 for the mothers and 31·5 for the fathers, these correlations were corrected to the accepted normal standard deviation of 27·0, with the following results :

Correlation of Intelligence of Child.	
With mother's intelligence.	*With father's intelligence.*
0·72±0·046	0·86±0·040

No previous enquiry has revealed any evidence of difference in parent-child correlation according to the sex of parent or child, and it seems reasonable to consider the above difference between mother's and father's correlation as insignificant unless further supporting evidence turns up. We may, therefore, combine these coefficients, through z function, to give a mean correlation of one child with one parent of 0·80. Corrected for attenuation this would become 0·84 ±0·036.

Of the intra-familial correlations there now remains to be discovered that between the siblings themselves. This coefficient has so often been the starting point in other researches for generalizations about heredity that particular interest attaches to it as a reference value in the present research. Since intelligence testing is in general more accurate with older than with younger children, we decided as a matter of interest, first to calculate the association between the two oldest children in each family only. The correlation is 0·94 ; corrected for scatter 0·90 and for attenuation 0·947 ±0·024. But there were only 80 families which could be included in this calculation, and we decided therefore to take all possible sibling combinations, a procedure which would result in 199 paired relations being taken into account. These were entered upon a scatter diagram by the method of double entry, which is usual and indeed inevitable where no systematic difference distinguishes the first from the second member of the pairs. The resulting correlation coefficient was 0·81 ±0·029. Corrected to the normal scatter of the population this becomes 0·73. Finally, corrected for attentuation it rises to 0·77 ±0·031. As it has been shown that the nearness or remoteness of the siblings to each other as regards age does not affect their degree of I.Q. resemblance[1] it seems unnecessary to analyse these sibling results in any further fashion and we may leave the coefficient of 0·77 ±0·031 unconditionally as a statement of the intelligence association of siblings.

To observe the effect of divergence in the parents' intelligence upon the variability of the children's intelligence we may proceed either to compare the correlation coefficients obtained by correlating the mid-children's intelligence respectively with the more able and the less able parent, or we may rank the families in order of magnitude of the inter-parental I.Q. difference and observe the corresponding variability of the children. Previous enquiries[2] have failed to reveal any significant effect by the first method, and have concluded that no large increment of intelligence can be considered to be acting as a simple Mendelian dominant. We adopted the second method, and, after ranking the families according to magnitude of parental I.Q. difference, divided the range into four equal sections in each of which the mean difference of I.Q. between the first pair of siblings was worked out. The results are as follows :

	Mean Difference of Parents' I.Q.s.	*Mean Difference of Children's I.Q.'s.*
1st Group	2·50	10·05
2nd ,, ...	8·00	11·30
3rd ,, ...	13·60	18·65*
4th ,, ...	24·95	15·35

Were it not for one anomalous instance in the third group,* where the difference of the siblings falls far outside the range of the differences of other siblings, the mean difference for children in that group would fall at 15·1 and be in accordance with the otherwise general trend towards greater variability of the children with greater variability of the parents. Even so the trend is very slight and of doubtful significance.

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[1] Finch, F. H. (1933) : "A Study of the Relation of Age Interval to Degree of Resemblance of Intelligence in Siblings."—*J. Genet. Psychol.*, 43, 389-404. Nevertheless it is curious that ~~the present~~ research is in line with Outhit's (*loc. cit.*) in yielding a higher correlation between the first and second born than between other siblings.

[2] Those of H. E. Jones and M. C. Outhit (*loc. cit.*).

V.—DISCUSSION.

It is not permissible to assume without further proof that the correlations between various family positions obtained in this research represent genotypical resemblances. For the family environment represents a large part of environmental influence in general, even with older children and those who have left home. Before one can examine the amount of inheritance it is necessary to decide whether the tests are in fact measures of innate potentialities.

A full review of the voluminous evidence concerning the extent to which a properly designed intelligence test measures something which is independent of the child's environment is not possible here. A very complete summary[1] up to 1933 and a more schematic one up to 1937 will be found elsewhere.[2] But the facts may be given in outline as follows: (1) Education, and even specific training for intelligence tests, does not significantly alter performance after the first acquaintance with intelligence tests. Training differences may therefore be overcome by presenting the subject with a preliminary practice sheet, the results from which are discarded, as was done in the present research.

(2) The I.Q. remains constant, within the limits of experimental error in individuals tested after the lapse of years and after subjection to different physical or mental environments. A few researches have indicated apparent exceptions to this in the tendency of foster children to resemble foster siblings, but this effect has been shown to be at least partly the result of assortative placement by welfare agencies.

(3) Children brought up in the same environment, e.g., an orphanage, manifest the same variability of I.Q. as those subjected to widely different environments (providing they are not drawn from a less variable parental group).[3]

(4) Twin studies show that identical twins, i.e., individuals of the same genetic constitution, differ by only two points of I.Q., and the correlation of their intelligences yields a figure no different from that obtained from re-testing the same individuals, whereas fraternal twins (in the same environment) differ on an average by 12 points. It appears that identical twins reared apart differ by two points of I.Q. more than those reared together, but the number of cases is as yet too few to justify generalization.

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[1] SCHWESINGER, G. C. (1933): "Heredity and Environment."—New York.

[2] CATTELL, R. B. (1937): "The Fight for Our National Intelligence."—London.

[3] LAWRENCE: "An Investigation into the Relation between Intelligence and Inheritance."—*Brit. J. Psychol.*, Mono. Suppl. No. 16, 1931, found a reduced scatter in orphanage children, but an equally great correlation with parental occupation. The circumstances, however, pointed to the parents not having the same range of capability as exists in the normal population.

(5) Comparison of experimental and control groups of children subjected to differing physical conditions, or suffering from different incidence of disease (except diseases directly attacking the central nervous system) yields no evidence of any significant difference in intelligence development.

From a critical study of the basic evidence the present writer has concluded[1] that the variations of environment (apart from diseases of the central nervous system), existing in the typical groups of our population with which experiments have been carried out, might at the most be responsible for a variation of from three to seven points of I.Q. This conclusion comes from the results of experiments with the Binet and other early *g* tests used in most of the researches so far recorded, and does not necessarily apply to more recent measurements.

Assuming a generous allowance for environmental influence in the present tests, say five points of I.Q., we may ask in what way and to what extent it would affect the correlation coefficient between parents and children. There are three main possibilities (1) that the intelligence of the mid-child has been shifted by similar environment five points nearer to that of the parents than it should be ; (2) Assuming, as is commonly held, that the well endowed are aided by a favourable environment and the less intelligent are still further handicapped by poor education, a more correct measure of intelligence would be obtained through increasing by five points the I.Q.'s of all families below normal, and reducing by the same amount all those above normal ; (3) Research in social psychology indicates that though (2) is partially true it is greatly upset by random influences. The third logical possibility would be that these influences are entirely random, the children of some dull parents having their I.Q. falsely raised by a good environment and others benefiting from no such influence.

To investigate the corrections resulting from each of these possibilities we proceeded to actual calculation, increasing the divergence of parents and children by five points to obtain a new correlation coefficient free from the first effect above, and decreasing the deviation of parents and of children by five points to obtain a correlation coefficient free from the environmental effect of (2). The result of the first procedure is to lower the coefficient (corrected for scatter and attenuation) to 0·73. The result of the second is equivalent to reducing the standard deviation of the mid-parents to 22·7 and the mid-children to 18·5 and acts upon the correlation coefficient in the manner of a selection to a smaller variability, reducing the coefficient to 0·82. But on a rank correlation formula the correlation would naturally remain the same and it is doubtful whether one can legitimately consider the correlation reduced. For the population as a whole, from which this group is considered to have a reduced variability by selection would also be reduced in variability of intelligence if we assume environmental influence to be acting in this systematic way.

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[1] *Op. cit.*

On the third supposition—that environment acts quite randomly with respect to the already existing intelligence—the true correlation coefficient would actually be a higher one, from which 0·91 would result through the reducing action of attenuation. We need not explore this unlikely possibility, indeed it is the contention of the writers that none of these problematic corrections deserves to be applied to the present results. For the first certainly does not represent the real state of affairs : the home environment would deflect the children's intelligence in the same direction and to the same extent as it would the parents. The nature of the environmental influence, if it exists, would seem to lie somewhere between the second and the third of the above possibilities, and since one of them would increase slightly the hereditary coefficient and the other would reduce it there seems no sufficient reason for tampering with the present coefficient.

Finally, the need for any allowance of this kind is reduced in proportion to the success with which the test is freed from acquired skills and information. The present tests are more recently designed than those for which the above environmental influence is calculated. They are constructed of sub-tests selected for high *g* saturation and absence of special factor overlap. Through experiment and revision they have been refined to pre-suppose in the subject only the smallest common denominator of general knowledge found in those who have attended an elementary school. In their verbal elements they require only the basal vocabulary possessed by children two or three years younger than those for whom the test is designed. Moreover in every case the test scale was chosen with a knowledge of the individual subject's social, economic, and educational background. With the same factors in mind the test was administered with all the care and skill that years of clinical experience could command.

The writers feel that there is particular need to set out the above considerations on interpretation as fully as space permits, because the actual magnitude of the correlations obtained is startingly high in comparison with earlier contributions and consequently stands in especial need of examination and criticism. No extensive comparison will be attempted here with the series of indirect researches prior to the work of Jones and Outhit, but a glance at two outstanding landmarks—the work of Pearson and of Thorndike—will show that the trend has been towards higher coefficients. Pearson[1] found one parent–one child and inter-sibling correlations of the order of 0·50 for phsyical traits, and concluded that mental traits were associated to the same degree. The means of mental estimate available to Galton and Pearson, however, would never have permitted the correlation to reach its true figure. Thorndike[2], using larger groups than anyone before or since, applying actual tests and correcting his coefficients for attenuation according to the reliability of his tests, decided that the inter-sibling correlation was about ·60 for intelligence. The correlations he actually obtained, however, were 0·70 in one city and 0·72 in another. He reduced these correlations because he had taken only high school pupils, from which population the duller members of each family would naturally be excluded. But it is equally legitimate to argue that his coefficients should have been augmented because the high school population represented a much diminished range of ability in comparison with that of the general population from which it was selected.

The coefficients obtained by Jones, and still more those obtained in the more recent research of Outhit, shew a further increase on the magnitudes considered likely in earlier researches. Their principal figures are set out below for comparison :

	Jones.[3]	*Outhit.*[4]
Mid-parent—mid-child correlation	·693 ± ·034	·802 ± ·033
Inter-sibling ,, ,, ...	·49· ± 180	·670 ± ·047
Father—mother	·598 ± ·042	·741 ± ·042

The first of these researches was carried out on the same number of families as was used in the present research, the second with half the number. Both are admirably thorough, exact and explicit. But it is the suggestion of the present writers that these researches, and still more the earlier researches which obtained yet lower figures, suffered from insufficient regard for the effect of selection of population, a selection which, owing to the difficulties of obtaining cases, almost invariably occurred. Sometimes there has been complete unawareness of the dangers of selection : always there has been failure to correct for it. Outhit had a bi-modal distribution of the parental I.Q.'s, as in the present research, together with an excessive representation of professional and business families in comparison with agricultural workers. Jones had an entirely rural group with an average I.Q. of 93, since he considered that " the population examined should be relatively homogeneous." It is impossible to get any agreement on intra-familial correlations so long as these selection factors are not attended to and corrected to some standard notion of a normal population. We cannot collate the inter-sibling correlation of Thorndike with that of Jones, when it transpires that whereas all of Thorndike's cases went to high school only 20 per cent of Jones' did ; nor can the latter's population be representative when its members are such that " none could be considered moderately wealthy."

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[1] PEARSON, K. : " On the Laws of Inheritance in Man."—*Biometrika*, Vol. II.

[2] THORNDIKE, E. L. : " Resemblance of Siblings in Intelligence."—27th Year-book of the National Society for the Study of Education, 19 Part I, 1928.

[3] JONES, H. E. (1928) : 27th Year-book of the National Society for the Study of Education, Part I ; and

[4] OUTHIT, M. C. (1933) : "A Study of the Resemblance of Parents and Children in General Intelligence."—*Arch. Psychol.*, No. 149.

But the use of primitive tests, defective in range, reliability and *g* saturation, and the failure to consider the effects of unconscious selection (or of deliberate selection with the misguided goal of a homogeneous group) are not the only factors likely to be responsible for wrong conceptions of the magnitude of the intra-familial intelligence correlations extant in a normal modern population. It happens that the two most adequate researches on parent-child relationship have been made in America, where it is relatively difficult to get a culturally uniform group, and indeed, in one of the researches some of the parents were not American-born. Again, with the exception of Thorndike's enquiry, none of the above-mentioned researches proceeds to the necessary step of correcting the coefficients for the attenuation resulting from test measurement variability. Finally, none makes any correction for the age decline of intelligence test scores in the older parents, though Outhit observes that there is an apparent differential regression of bright and dull children towards the mean and that the parents of the brighter children tend to be older, i.e., the parents of the brighter children may be systematically underestimated in intelligence. All[1] of these five[2] factors, if their influence is neglected, will tend to reduce the correlation from its true value.

Our conclusion, therefore, is that the mid-child-mid-parent correlation coefficient is of the order of 0·9, which means that between the parents and the children in one family there is nine-tenths of commonality in constitutional intelligence. From this it follows that approximately four-fifths of the variability of intelligence among families in this country is due to heredity.

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[1] With the exception of that part of test invalidity due to environmental susceptibility in the test.

[2] No practical research worker can overlook a sixth attenuating influence, namely the presence, in any sufficiently large sample, of a number of unacknowledged illegitimate children.

Such a conclusion does not entitle us to argue that the remaining one-tenth represents the scope of environmental influence. For in the first place there is an heredity influence not represented in the above correlation—namely, the regression "over the heads" of the parents to grandparents and others, through the action of recessives. Secondly, through the influence of mutations, of unknown frequency, there are innate factors in some children's intelligence development not present in parents or grandparents.

VI.—SUMMARY OF RESULTS AND CONCLUSIONS.

(1) The correlations of intelligence for the main intra-familial relations, in a population under the conditions and possessing the variability of the present-day British population, are as follows:

Correlation of mid-parent and mid-child .... =0·91 ±0·028
,, ,, one parent and one child .... =0·84 ±0·036
,, ,, mother and father .... =0·81 ±0·039
,, ,, pairs of siblings .... =0·77 ±0·031

(2) These figures are higher than those obtained in previous researches but, with the exception of the second, which is a little too high to be internally consistent with the others and which is based on fewer cases, it seems likely that present figures are nearer the true values. For earlier enquiries failed to allow for selection, age change of intelligence score in parents, attenuation and other disturbing factors.

(3) Since there is massive evidence that the I.Q. is insusceptible to any extent to environmental influence, and since even an allowance of 5 points of I.Q. for environmental influence does not affect the general order of the correlation, we may conclude that the correlation represents in the main the hereditary determination of the children's intelligence by that of the parents. In that case nine-tenths of the children's and parents' intelligence is common, whilst four-fifths of the variability of intelligence between families is due to hereditary factors.

(4) For the practical purpose of calculating the probable intelligence of the children (mid-child), knowing that of the parents, we may employ the following regression equation:

I.Q. of mid-child=I.Q. of mid-parent×0·8+28·0, the probable error of estimate being 9·1.

RÉSUMÉ.

UN ARTICLE RELATIF À L'HÉRITAGE DE L'INTELLIGENCE.

L'on appliqua des tests d'intelligence aux parents et aux enfants de cent une familles, les tests étant adaptés en chaque cas à l'âge et au niveau d'instruction de l'individu. Des coefficients de corrélation, corrigés quant aux anomalies de l'échantillonnage et à l'atténuation, furent établis entre parents et enfants, un parent et un enfant, mari et femme et entre jumeaux. Ces coefficients furent calculés et sur les données originelles et sur des données corrigées quant à la baisse, due à l'âge, des points obtenus par les adultes dans les tests.

Il suit une discussion de l'influence du milieu sur le I.Q., qui conclut que la corrélation de 0.9 entre la moyenne des deux parents et celle des enfants d'une famille s'explique en grande partie par l'hérédité. L'on suggère un coefficient de regression pour calculer l'intelligence probable de la moyenne des enfants en partant de l'intelligence connue des parents.

ZUSAMMENFASSUNG.

BEITRÄGE ZUR VERERBUNG GEISTIGER ANLAGEN.
I.—ÜBER DIE INTELLIGENZ.

Intelligenzprüfungen wurden Eltern und Kindern bei 101 Familien gegeben. In jedem Falle wurden die Prüfungen dem Alter und dem Bildungsgrad des Einzelnen angepasst. Korrelationskoeffizienten, die für anomale Proben und für Wertverminderung verbessert worden waren, wurden zwischen Eltern und Kindern, zwischen einem Vater (oder einer Mutter) und einem Kind, zwischen Gatte und Gattin, und Brüdern und Schwestern berechnet. Diese Koeffizienten wurden nach den ursprünglichen Grundlagen und denen, worin die Altersabnahme in den von Erwachsenen bei den Intelligenzprüfungen erzielten Resultaten ausgeglichen worden war, ausgearbeitet.

Es folgt eine Besprechung des Einflusses der Umgebung auf den Intelligenzquotienten, wobei der Schluss gezogen wird, dass die Korrelation von 0,9 im Elterndurchschnitt und im Kinderdurchschnitt hauptsächlich auf die Vererbung zurückzuführen ist. Ein Repressionskoeffizient, mit dem man die wahrscheinliche Intelligenz des kinderdurchschnitts auf Grund der bekannten Intelligenz des Vaters orer der Mutter berechnen kann, wird gegeben.

THE BEGINNING AND EARLY FUNCTIONS OF QUESTIONS IN A CHILD'S SPEECH.[1]

BY M. M. LEWIS.

I.—*Introduction.*
II.—*What is a question?*
III.—*The main stages of development.*
IV.—*Stage I*: *The child demands linguistic intercourse.*
V.—*Stage II*: *Questions preliminary to action, within the present situation.*
VI.—*Stage III*: *Questions with reference to an absent situation.*
VII.—*Stage IV*: *Questions independent of action.*
VIII.—*The true information question*: (*a*) *Where?-questions.*
  (*b*) *Naming-questions.*
  (*c*) *Source or goal questions.*
  (*d*) *Why?-questions.*
IX.—*Conclusion.*
X.—*Summaries of observations.*

I.—INTRODUCTION.

CHILDREN'S questions have often been analysed and discussed, and many studies have been made of the kinds of questions and of their significance. But the topic which I am going to consider in this paper has, I think, hardly yet been dealt with: the genetic problem, which still remains obscure. I am asking, What is the origin of questions in a child's speech, how do they begin, what is their early function, and how do they develop?

In recent work it has been increasingly recognised that one of the most important features of language is its social function—by means of language the individual obtains social co-operation in attempting to satisfy his needs. Here I intend to show that the growth of questions in a child's life can best be understood if looked at in this way: questions arise and develop in the course of a child's endeavour to use language as a social instrument.

William Stern makes an illuminating remark on this point. He says (Reference 7, 213, at end of article) that the child's early questions do not express his desire to *know* about things, but rather his desire to *have* them. This is certainly the most important clue to our understanding of children's early questions : they are not at the outset a means of acquiring information, but a mode of action by which the child attempts to secure action from others.

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[1] The early part of this paper was summarised at the Meeting of the British Association (Psychology Section), Nottingham, 1937.

II.—WHAT IS A QUESTION ?

What is its function in everyday life? A question is a form of utterance by means of which we call upon a listener to reply : that is to say, produce in his turn an utterance upon which we may proceed to further action. A speaker asks a question when in doubt : that is, he suspends further action until the listener has provided an answer. The two chief characteristics of questions are, therefore, these : first, there is linguistic intercourse which for the moment replaces physical action ; secondly, the questioner does not proceed further with his activity until he receives a reply which determines this activity.

Questions, then, are a means of bringing social co-operation to bear upon actual or potential physical action. The individual, instead of "imagining" or "reasoning" in solitude before he acts, brings others into discourse with him, and so secures the benefit of their experience and understanding. In human society this kind of discourse has become a realm of its own—the realm of question-and-answer, the realm in which all the most important human intercourse now takes place.

III.—THE MAIN STAGES OF DEVELOPMENT.

What can we observe of the stages of a child's development in this direction? We need a record not only of the questions which a child asks, but also of the circumstances in which he asks them. Serial observations of this kind are not, as far as I know, to be found in the published records ; I shall therefore have to confine myself to an account of my own observations of a boy K. I shall attempt to show that in his case the development of questions took the following course :

Stage I.—The child demands that another person shall speak to him—this is the beginning of linguistic intercourse.

Stage II.—The child begins to ask questions, in a tentative way, as a preliminary to an intended act, within the situation in which he finds himself.

Stage III.—The child's questions begin to refer to things absent from the present situation.

Stage IV.—The child's questions begin to be independent of any situation or intended physical act.

The earliest instances of each of these stages in the case of K are shown in Series I at the end of this paper.

In considering the stages in detail, I shall attempt to show that two factors are at work throughout:

(1) The child's tendency to use language as a form of play.
(2) His use of language in the attempt to satisfy his needs.

In both of these functions of language it is used co-operatively: the play is the game of question-and-answer, and in the instrumental use of language the child calls in another person to his aid, in his attempt to satisfy his needs.

IV.—Stage I: The child demands linguistic intercourse.

Whenever we go back to the origins of one of the functions of speech, we find ourselves having to deal with a rudimentary trace, something apparently very different from what the function afterwards becomes. In the problem before us, we take as our beginning at 1 ; 6, 3[1] (Series I, p. 165) an utterance which at first sight looks very remote from what is normally understood by a question.

What is happening here? The child is using his sounds ɛ ɛ ɛ as a means of causing another person to do something, in what I have called a manipulative manner (2, 148); he is causing another person to act. But he has been doing this for a long time past; what we have to notice is the new development that now takes place—the act which the child demands and receives is not a physical act, it is a *speech-act*. In this way the use of ɛ ɛ ɛ[2] at 1 ; 6, 3 stands half-way between the child's previous use of language and his later questions. It is like his early use of speech in that it is a means by which he brings about an act by some other person; it is like his later questions in that it is a speech-act which evokes, as its response, another speech-act.

We can observe this more clearly if we glance at Series II, p. 166.[3] Here we find that at 0 ; 10, 28 the sounds *a a a* are used almost entirely as an expression of the child's excitement, and are hardly at all directed towards securing a response from another person. Gradually this second function, that of securing a response, develops, and by about 1 ; 4, 0 is in full use. Now at 1 ; 6, 3 something new happens—the child demands that he shall be spoken to: why does he demand this? The answer is that the child has become used to games in which his mother names one picture after another, so that when she stops for a moment he demands that she shall go on. Thus a sort of interrogation, of question-and-answer, arises as play; and this element of play, as I shall show, remains throughout the child's early history a strong factor in fostering his use of questions. It gives him pleasure to speak merely in order to be spoken to.

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[1] *i.e.*—1 year, 6 months, 3 days.
[2] Symbols of the International Phonetic Association used.
[3] Taken from the fuller record in 2, 305-7.

But this is not the only course of his development. Soon he engages in linguistic intercourse as a preliminary to action: to this change we must now turn.

V.—STAGE II: QUESTIONS PRELIMINARY TO ACTION, WITHIN THE PRESENT SITUATION.

At 1 ; 9, 12 (in Series I) we find the first indication of this new phase in the case of K. The child is about to perform an act, and as a preliminary he calls upon another person to sanction or prohibit the act. He is asking for permission.

In saying this, we are not merely inferring the intention of the child or "what is going on in his mind." We are giving a description of what can actually be observed. Up to this moment, whenever the child has evoked speech from another person, the arousal of this response has in itself satisfied the child, as a sort of game. Not so on the present occasion. The child desires to open the cupboard, he stretches out towards it, saying ɛ ɛ ɛ; this evokes a reply from the adult which in its turn determines the child's subsequent act, whether to open the cupboard, or ask another question. And there cannot be any doubt that all this was intentional, for both cupboards were well within the child's reach; yet he suspended his physical act until he had spoken and received the adult's replies.

Clearly, an important change has taken place between 1 ; 6, 3 and 1 ; 9, 12. As the instances stand before us in Series I, one might well be pardoned for regarding the emergence of Stage II as a "sudden step," but a survey of K's linguistic history in those intervening three months shows that this is not the truth. We find, instead, that the new stage of development arises out of the convergence of processes already present, mainly these:

(1) The child's tendency to accompany his acts by speech;
(2) The growth of his responses to other people's *Yes* or *No*;
(3) The growth of his own use of *Yes* or *No*.

Instances of the first tendency we have already noticed in Series II: the child, in reaching out for things, utters sounds. Speech of this kind acquires value for the child to the extent that the adult responds to it; by giving him, for instance, the plaything he is trying to reach. Now enters the second factor: for a long time past the adult has been sanctioning or prohibiting the child's physical acts by saying *Yes* or *No*: K, for instance, responded correctly to *No*, as early as 0 ; 9, 5, by desisting from the act that he was about to perform.[1] There comes a moment when these two processes converge: the child precedes an act by speech, the adult says *Yes* or *No*, and this in effect becomes a reply to the child's utterance, as we have seen at 1 ; 9, 12.

Meanwhile, the third factor has also been at work—the child has learnt to say *Yes* or *No* in reply to the adult's questions. Instances of this are given in Series III, p. 166. Again the starting-point is the child's tendency to accompany speech by acts; but here the part of the adult is to incite the child to speak. Thus in our first case, at 1 ; 6, 3 (Series III), the child has already been accustomed to say *ba* when making for the bathroom; now the adult incites him to say it in answer to a question. There comes a moment when the child, about to act, will say *Yes* or *No* in answer to an adult's question, and this answer is a valid substitute for the child's act. See, for instance, entry 1 ; 9, 2 in Series III; the child is learning to substitute words for deeds, and so learning the significance of the adult's *Yes* or *No*.

The growth of questioning at this stage will, then, work in something of the following fashion. The child reaches out towards an object, saying as he does so ɛ ɛ ɛ: this is a demand, but it is a tentative demand and therefore partly a question. If now the adult says *Yes*, the sequel is that the child is allowed to proceed with his act; if the adult says *No*, the sequel is that his act, if he persists, is met with disapproval, and the object may even be removed beyond his reach. Thus the child's speech-act has evoked a linguistic response from the adult; a speech-act which the child will increasingly recognise as having a decisive bearing upon the success or failure of his intended act. In this way the child is using his utterance as an exploratory preliminary to a physical act; he is able to obtain the co-operation of others, not merely with regard to an act that he is actually performing, but with regard to an act that he is about to perform. It is clear that questioning will gain value for the child in that it helps him to choose approved acts and to avoid disapproved ones.

Play at this stage.—One further point is worth noticing: as soon as the child has achieved this interchange of speech with an adult, his constant tendency to play asserts itself: as I noted at 1 ; 9, 12 (Series I), "All this is repeated about a dozen times as a game." This, I think, is likely to characterise every new advance in the child's linguistic development—perhaps even in his general development: a new achievement, which perhaps primarily may have been directed towards some end, attracts the child in itself and provides a field for the exercise of his self-assertion and desire for mastery. It is clear that a game of this kind will provide practice in question-and-answer, and that this in its turn will promote the child's use of questions in the attempt to satisfy his needs.

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[1] For a survey of this development, *see* 2, 109, 121.

VI.—STAGE III : QUESTIONS WITH REFERENCE TO AN ABSENT SITUATION.

The child's needs do not lie only within the present situation : sooner or later his questions begin to refer to what is absent. In K's history, this development falls into two phases, IIIa and IIIb, Series I. If we compare the two episodes, at 1 ; 10, 3 and 2 ; 2, 3, we notice that in the intervening four months an important change has taken place—at 1 ; 10, 3 the child is satisfied with the interchange of speech in itself, as a sort of game ; at 2 ; 2, 3 he proceeds to act upon the answer that he has received.

Stage IIIa.—How does the child arrive at this point of asking a question concerning something that is not actually present in the situation before him? Again the answer is to be found by observing the child's previous history. The word *dœdi* uttered by the child is not only a question, it is partly a demand for something not present, and the making of such demands has long become habitual to the child. I have traced the growth of this elsewhere (*3*) ; here in Series IV I have selected a few observations from K's history which show the relation between this development and the instance at 1 ; 10, 3 now before us. We notice that in the child's first reference to an absent object, at 1 ; 4, 17, this is still very closely linked to the present situation—the child is accustomed to see the honey on the table, and even now it is only hidden from him by the cupboard door. The adult, then, can respond to the child's demand by a simple physical act. But there comes a time when the child's demands, referring to something absent from the situation, cannot be dealt with physically, and the adult is forced to make a linguistic reply. An instance of this is given at 1 ; 8, 24 (Series IV, p. 167) ; the child demands *gɔgɑ*, and all that his mother can do is to say, *When we go out,* whereupon he shows that he has understood her by saying *tata.* Finally there comes a time (in K's case at 1 ; 10, 15) when linguistic intercourse has become so habitual that the adult will reply by speech even when a physical response would have sufficed. When the child said *hɔum,* all that the mother need have done was to turn the carriage about ; instead of this, she asked a question, *Whom do you want to see?* to which the child in turn replied *gœni.*

In the course of this development there occurs the instance at 1 ; 10, 3 where the child utters what is apparently the first real question about something absent. But can he be said to ask the question with the intention of securing information? I think not. What happens is that the child makes a *demand* for an absent person, in the way that he is now accustomed to do; his mother answers him verbally, and the novelty of the achievement—question-and-answer about what is absent—takes the child's fancy. Immediately he asks another similar question: *k*ɑ?

Actually, then, it is the adult who helps to make the child's demand into a question. In so far as this demand is tentative, it has within itself the rudiments of a question; it is the rôle of the adult to emphasise its interrogative character and to turn the child's initial demand into the interplay of question-and-answer.

This interplay immediately attracts the child's attention which, at the moment of making his first demand, is only very slightly directed towards what is absent, so slightly indeed that the experience of getting an answer is sufficient to sidetrack his attention, and he turns to the speech activity as to a game. We see that the atmosphere is one of play by the fact that the mother goes on to ask *Where's Mummy?* and that the child points to her and answers ɛ ɛ ɛ. His attention, in fact, has been short-circuited from the absent person to the present verbal play—another instance of the child's tendency to find satisfaction in a new achievement by playing with it. For the moment, the child is much more interested in getting an answer than in the meaning of the answer.

Ultimately, however, there comes a time when the urgency of the child's interest in something absent is sufficiently strong to overcome his delight in the linguistic interplay before him. He persists in his reference to the absent thing, and instead of indulging in the game of question-and-answer, acts upon the adult's response. At last, because the child's question has become preliminary to action bearing upon what is absent, we can say that it really is a question intended to deal with what is absent.

Stage IIIb.—K's behaviour at 2, 2, 3 (Series I) is his first instance of this. He asks a question—ɑː*nti j*ɑ—which can only be answered verbally, and as soon as he receives the answer, follows it up with a demand. The interest of the child is no longer satisfied merely by the adult's reply about the absent person; he goes on to demand that some action shall be taken about this absent person.

It is clear that in reaching this stage the child has enormously increased his power of dealing with absent situations. At Stage II he had already achieved the power of bringing social co-operation to bear upon the present situation; then for a time he would allow his linguistic reference to an absent situation to be diverted by play. But now at

2 ; 2, 3 the child begins to follow up his questions—he will not allow his interest in playing with speech to turn him from his more vital aim, the need which called forth his question. He has reached the stage where his questions referring to an absent situation are clearly a means to an end, the aim of bringing the attention of others to bear upon that situation.

This again is no sudden change. It grows out of the child's increasing pre-occupation with absent things, which itself is fostered by social co-operation through language. Then for a long time the child obtains practice in interrogation by playing the game of question-and-answer, which again can only occur through social co-operation. Finally, the child's attention to what is absent is allowed to have a practical sequel by the willingness of others to help him ; again social co-operation. The child's ultimate achievement—asking a question fully intended to bear upon something not actually present to his senses—is therefore largely brought about by the concurrence of the society in which he lives.

VII.—STAGE IV : QUESTIONS INDEPENDENT OF ACTION.

We come next to the stage at which the child begins to ask questions not as a preliminary to action, but for the " sake of information." Questions of this kind appeared for the first time in K's history at 2 ; 7, 9 (Series I).

What is the function of a question such as this ? We can say that the answer interests the child, not as play with words or even as a preliminary to action, but because it " satisfies his curiosity." In brief, the child's question is taking the place, instrumentally, of the exercise of his senses as a means of exploring the external world. In his linguistic development, speech progressively takes over one after another of the physical means of coming into contact with the external world and attempting to deal with it. The " information-question " is the replacement of the physical means of satisfying curiosity by the instrument of speech.

Let us notice the characteristics of this new kind of question at 2 ; 7, 9. First of all, as we have said, it is relatively independent of any action that the child intends to take, either in the situation before him, or in a future situation. The child merely " wants to know " whether his mother has been out to tea. Secondly, it is a " Yes-or-No " question ; and this is a very important point—the child is really making a statement, but in an interrogative fashion. He is making a tentative statement of his knowledge, and demanding corroboration of it. I find that in K's history his early information-questions are mainly of this form, and in this respect it is instructive to compare them with his questions at Stages II and III. At 1 ; 9, 12 the child's question is a tentative demand, exploratory with regard to action in the present situation. At 2 ; 2, 3 his question is a tentative demand, exploratory with regard to an absent situation. Now at 2 ; 7, 9 his question is a tentative statement, exploratory with regard to the " realm of knowledge."

To put this in terms of what may actually be observed, we may say that there is a universe of events beyond the reach of the child's own experience, a universe which can be formulated in speech. The child learns to tap this source of knowledge by calling in the co-operation of others, and he does so by making a statement half in play, half in earnest ; a statement which is tentative, demanding corroboration ; to that extent a question.

What is the relation between this stage of development and the earlier stages? In Stages II and III the child's questions were preliminary to intended physical action within an actual situation, either present or absent ; now they come to refer to a universe of discourse, a world of words. How can the transition possibly occur? Is this a new phase, suddenly dawning in the child's life—the beginning of the search for pure knowledge? Now if we make a sharp division between the world of physical action and the world of knowledge we are certainly in an inescapable difficulty, we cannot bridge the gap. But the fact is that the child's world of knowledge is, at first, closely bound up with the world of action ; and his private world of thought is an actual part of the world of social co-operation and closely bound up with the thought of others.

From Stage III to Stage IV.—The occurrence of the information-question is, we find, no sudden step. In the case of K we can observe the change taking place if we consider observations made between 2 ; 2, 3, the beginning of Stage IIIb, and 2 ; 7, 9, the beginning of Stage IV (Series V).

If we look through this Series, we find that it falls into two phases, the second of which begins about 2 ; 5, 0. The child's remarks during the first phase are in one respect rather less than questions : they do not appear to be addressed to any other person. They are, in fact, examples of what Piaget (*4*) has called egocentric language ; but the aspect of them which I should like to stress here is that they are an accompaniment to action, and have an important function with regard to action. The child asks *edə kæn tedi* bɑ : *bi* ? (2 ; 2, 23) or *vɛəz ə kiŋ* ? (2 ; 4, 19), not because he really wants to know the answer, but as a means of stabilising his own physical act, of helping to direct his own attention. We could say, perhaps, that the child is " thinking aloud."

Are these remarks then, questions at all? They are : in two important respects. In form they are clearly questions, showing the child's increasing adoption of the intonation and structure of adult questions. Secondly, there is an almost imperceptible transition from them to the second phase—beginning at 2 ; 5, 0—where certainly we find information-questions demanding something of an answer. Let us compare, for instance, entry 2 ; 4, 6 with entry 2 ; 5, 0. In the former of these, while the child is trying to put on his pants, he asks, *vitʃ iz ə bæk æn fwɑnt?* very much as an adult might do in the same predicament, and without any more anticipation of an answer. At 2 ; 5, 0 the question *var iz it?* is still very much in the nature of an accompaniment to the act of seeking the strip of felt—the remarks aid the child in his search, making his act more definite—but it is more of a question in that it is more clearly directed to the other person present. It is, in its form, an information-question—still, it is true, bound up with action—but paving the way for those questions which are free from any specific action or situation.

The way is made easier by another tendency which now begins to appear. The child asks "rhetorical" questions, questions to which he already knows the answer. Instances of this are the last three entries of Series V : in all three cases the child knew the answer at the moment of asking the question. It is clear that this is partly a game, the game of question-and-answer (e.g., 2 ; 6, 17), and partly a tentative questioning, seeking corroboration, which either another person (2 ; 5, 24) or even the child himself (2 ; 7, 6) can supply. These "rhetorical" questions are, to a very great extent, the child's imitations of adults' questions, and the child asks them, not because he is seeking information, but for the mere pleasure of achievement, of exercising himself in a recently-acquired skill. Finally there comes a moment (2 ; 7, 9) when the child asks a question a little more directed towards another person, a little less "rhetorical," and with this there begins to emerge the information-question. It is clear that the adults around the child will retard or hasten this process to the degree in which they co-operate by replying to his remarks when these are still on the way to becoming questions.

To summarise this transition-period : we see the child beginning to use *Who? Where? What?* and *Which?* in questions which are information-questions in form. In actual fact, they are only rudimentary questions, for the child utters them, not yet because he "wants to know"—he has not yet realised the need or the possibility of securing information—but partly in an imitative way, partly as a game, partly as an accompaniment to action. Day by day, as others respond to these remarks, they become more and more directed to a listener, until the child begins to realise the possibility of social co-operation in securing information; and so he enters upon Stage IV.

The Yes-or-No-question.—K's early information-questions were, as I have said, mainly of the Yes-or-No form, and the earliest case at 2 ; 7, 9 is typical of them all. Quite clearly there is an advance from 2 ; 7, 6 (Series V) ; when he asked *Mummy been to London?* this was a "rhetorical" question, as we can see by the remark which follows—*To see the queen.* But now when he asks *Has Mummy been out to tea?* he really wants to know.

Let us notice, however, that the Yes-or-No question, while an advance beyond the "rhetorical" question, has still some kinship with it. Still the child is asking a question more or less in play, and in the Yes-or-No question, if the child does not know the answer, at any rate he suspects it. He is, more or less, making a statement and asking for confirmation of it.

Yet in the Yes-or-No question something else occurs ; and this is the point of progress. The answer given to the child—in so far as it has not been anticipated by him—provides him with new knowledge, and knowledge which he cannot acquire by physical action. For knowledge of this kind he must depend upon the linguistic co-operation of others.

VIII.—THE TRUE INFORMATION QUESTION.

So the child will pass to the question in which he really asks for information. In the case of K, the Yes-or-No questions gave place to information-questions of four kinds ; questions

(*a*) directed to the whereabouts of some object (Where is it?)

(*b*) intended to secure the name of an object (What is this?)

(*c*) directed to the source or goal of an object or event (Where does this come from? Who did this? Where is this going to?)

(*d*) directed to the cause of an event (Why?)

(For examples, see Series VI.)

Since this classification agrees with the summaries of Stern (*7*, 213) and C. Bühler (*5*, 149, 171), and may therefore be regarded as typical, a closer analysis of K's history should throw light upon the problem of the growth of questions.

(*a*) *The where?-question.*—Questions of this form occur comparatively early, either as an accompaniment to action (Series V, 2 ; 2, 23) or as a preliminary to action (Series VI, 2 ; 7, 8). It is long, however, before the child asks *Where?* merely in order to secure information irrespective of subsequent action : in the case of K, not one instance of this kind occurred before he was 3 ; 0, when I ceased making a regular record of his speech.

But I have some observations which show the rudiments of growth in this direction. Development takes place through the persistence of two tendencies which we have already noticed : play, and the asking of " rhetorical " questions. An instance of play is at 2 ; 8, 2 (ii), Series VI ; the child is certainly not seeking knowledge when he repeatedly asks, *Where?* and his final question, *Where's quiet?* is typical of the nonsensical questions which children ask in play. An interesting example of the child's tendency to seek the socialisation of knowledge is at 2 ; 9, 3. In earlier instances we have seen K asking questions to which he knows or suspects the answers ; here he has actually reached the point of asking a Where ?-question simply in order to display his own knowledge. It is clear that both play and " rhetorical " questions will ultimately lead to those in which the child really asks for the whereabouts of some object, having no knowledge of the answer, and irrespective of subsequent action.

Why does a child ask a question to which he already knows the answer ? Looking at the matter objectively, I do not think there can be any doubt that the incentive is the same as that which was already present when he began to ask Yes-or-No questions, and is now even stronger. The child is learning to make formulations of events in words, and seeks social sanctions for these formulations. Another way of putting this would be to say that he is building up systems of knowledge, and seeking what may or may not be admitted into the structure. He begins by making tentative statements which, having an interrogative form, invite corroboration or rejection by others in the answer *Yes* or *No*. As time goes on, the interrogative form becomes more pronounced : the child asks *Where is . . .?* as a tentative statement which requires a complement in the form of an answer, but the answer is not necessarily at this stage unknown to the child. He is seeking sanctions for statements which he can already formulate for himself, and at this stage it is social sanction for what he already knows that satisfies him, rather than the pursuit of new knowledge. Finally, there will come a time when the child will ask Where ?-questions purely in order to learn. In the case of K, the observations go to show that the true Where ?-question arose after a period of play and pseudo-questions : and this suggests that the child's realisation—as a result of social co-operation—that his Where ?-questions do give him information about the absent world leads him in the end to ask them with this purpose in view. As the child asks these questions, he builds up for himself a spatial formulation of the arrangement of things, and as this grows, the stronger will be the tendency for him to ask further Where ?-questions.

In the case of the other three groups of question—naming-questions, source or goal questions, and causal questions—we can observe the process more fully worked out in K's history before he was three.

(*b*) *The naming-question.*—Entry 2 ; 7, 15, in Series VI provides a clear example of the What ? or naming-question. By questions such as these, the child brings a hitherto unnamed object within his universe of named objects. A rudimentary form of this process we have already noticed as the very beginning of K's questions (1 ; 6, 3 in Series I). There the child used his query ε ε ε as a means of evoking from another person some remark in turn ; but we may well doubt that the child had any notion of the relation between the word *jug* and the object to which it is attached—that the word was the name of the object. Now, with such questions as these at 2 ; 7, 15, and 2 ; 8, 2, there can be no longer any doubt of the child's awareness of this relation. When he asks *What does this say* ? pointing to a word, or *What's that* ? pointing to the swelling on the apple, he is demanding, it is clear, that these objects shall be brought into relation with a certain system—his own system of linguistic activity, the world of named things. When, as in these cases, we find the child asking naming-questions with awareness of their function, we can say with some certainty that at last he has entered in a new field, where he is asking purely for information. For it is no longer merely the game of question-and-answer ; no longer a question related to action within the present or an absent situation : but a question whose sole function it is to relate a particular object of the physical world to the world of "thought" —a linguistic world, the world of names.

(*c*) *Source or goal questions* (as illustrated at 2 ; 8, 12 (ii) in Series VI) show this same process in a more complicated form. As always, development may appear either as a game (2 ; 8, 2) or as tentative questions to which the child knows or suspects the answer (2 ; 8, 12 and 2 ; 8, 30) ; out of these latter arising questions to which he does not know the answer (2 ; 10, 12), questions asked for the sake of " pure information."

Two points here need to be noticed. The first is that in the early stage of this development the child really does frequently know the answer to his question. Both *Who bought that frock* ? (2 ; 8, 12) and *Who did these up* ? (2; 8, 30) taken by themselves might appear to be true questions, but in each case the immediate sequel shows that the child had already fitted the event, about which he asks, into a universe of discourse of his own ; had, in fact, supplied an answer to his own question.

Secondly, it is clear that this kind of question will lead on to those in which the child is more venturesome, in which he relies more and more upon the co-operation of others to fill the gaps in his knowledge (for instance, 2 ; 10, 12). In the earlier cases, he fits events together for himself —finding one the source or goal of the other—and then formulates the relationship for himself in words, asking sometimes for social corroboration of what he himself has done. Now he goes further, he uses questions as a means of discovering new relations: he relies upon the other person to supply an answer, and in this way is able to develop his own realm of relationships by means of social co-operation.

(*d*) *Why ?-questions.*—Finally, we come to the Why ?-question, a topic which has perhaps been discussed more than any other in the psychology of children. Here we are concerned only with its relation to the growth of questions in general; as our starting-point we may take the earliest instance in K's history: at 2 ; 9, 7 (Series VI).

Let us ask ourselves here again what happens, looking at the episode objectively and making the fewest possible assumptions. When the child is told by his mother that she cannot stop the rain, and asks *Why can't you ?* what is he demanding, what does he want his mother to do? The statement that she has made is in some way incomplete for him, he is asking for an explanation. But when we say this, what do we mean? We mean that the child wishes his mother to give a linguistic elaboration of the statement that she has just made. That is, he wants her to lay out in more words the implication of her remark that she cannot stop the rain. In brief, the child's *Why ?* is at first uttered hardly with the intention of securing a causal explanation; it is uttered rather in order to secure an explanation, linguistic intercourse, by which the formulation of one event may be fitted together with the formulation of others. At first, then, the relationship which satisfies him (and which perhaps he expects) is one of juxtaposition; only gradually, out of this, does the notion of causality arise.

Examination of some of the records of K illustrates this pretty clearly: for instance, the two examples at 2 ; 9, 9 and 2 ; 9, 23. I think it is evident in all these cases that the child is formulating a perceived event in words, and asking the adult to link this up with other events. No doubt there is some rudimentary notion of causal connection present for the child when he asks his question—perhaps we may admit this; but rudimentary it certainly is, and it only develops by the child's constant experience of the causal answers that he receives. In other words, social co-operation gives a constantly increasing causal meaning to the child's *Why ?*

Two observations deepen this impression: the first is the fact that the child uses *Why ?* when he well knows the answer himself. His question at 2 ; 10, 18, *Why do we use a spoon ?* might appear to a casual listener to be a genuine demand for information; but his mother has no scruple in turning his *Why ?* back on him, when we discover that he is perfectly able to give the answer himself.

The second point of interest is his own use of *because*, both in this case and earlier. The child says that we use a spoon because we cannot drink soup with our hands. Is he really aware here of "cause and effect," or is he not rather linking up two events which he finds to be closely connected? He is saying in effect that for soup we use a spoon because we do not use our hands (whereas for other foods we do use our hands). Similarly when he uses *because* at 2 ; 7, 24 and 2 ; 9, 0. At 2 ; 7, 24 when he says *Must not break this 'cause K made it,* it would be assuming a great deal to assert that he meant more than this—that K has made it and does not wish it broken. The case at 2 ; 9, 0 is more crucial : when K's mother suggests that perhaps on Sunday Lily would accompany them, he replies *Lily can't come,* and being asked *Why?* replies *'Cause of George*—George being the young man who visits Lily on Sundays ! Now this is certainly intelligent and involves a realisation of the connection between the two events—the absence of Lily from the party, and the visit of George. But does the child see the connection as cause-and-effect? I am inclined to think that at the most he sees that the absence of Lily is equivalent to the statement that she is occupied with George. It is very much as though he were asked *What do you mean by the statement that Lily can't come?* and were to reply : *I mean that Lily does not come out with us on Sundays when she is visited by George.*

I would certainly agree that it is out of verbal connections of this kind that a child's notion of causality will develop ; but I am urging that such a notion is only rudimentary in his early Why ?-questions, developing under the influence of social co-operation in question and answer. In brief, the process that we have seen exemplified in the development of the first three classes of information-questions is characteristic also of the fourth class—the Why ?-questions.

IX.—Conclusion.

In this paper I have tried to show that the growth of a child's questions is determined by social co-operation working upon two powerful tendencies in the child—namely, to use language as play and as a means of satisfying his vital needs. Throughout the whole course of development play with question-and-answer gives the child practice in using questions and in replying to them before he is fully aware of their functions, and so in fact fosters the growth of these functions. At first the child uses questions as a preliminary to action within the present situation, later as a preliminary to action in a future situation. Then the growth of linguistic intercourse shows itself in the use of questions to which the only answers can be verbal. At first the child uses such questions as a means of securing corroboration of statements that he can already make for himself, finally as a means of securing information. But throughout, the growth of the various categories of questions depends very largely upon the replies that the child receives ; that is, upon social co-operation.

X.—SUMMARIES OF OBSERVATIONS.

Note.—A=adult; C=child; F=father; M=mother.

SERIES I.

MAIN STAGES OF DEVELOPMENT.

and *ge.*	*Circumstances.*	*Adult's Speech.*	*Child's Speech.*	*Conventional Equivalent.*
6, 3 ge I : child ands ech).	M and C with picture-book. M asks	Where's eggie ?		
	C points to picture of egg. Then he comes upon a picture of a horse. Looks up at M enquiringly; she says........................	Horse.		
	C comes next to a picture of a jug; he points at it and looks at her. When she does not reply he says urgently		ɛ ɛ ɛ	
	and continues, until she says....	Jug.		
9, 12 ge II : stions minary ction).	In M's room are two small cupboards side by side, one of which C is forbidden to open. To-day he points to forbidden cupboard, and says interrogatively............		ɛ ɛ ɛ	
	M replies	No.		
	C points to other cupboard, saying, as before		ɛ ɛ ɛ	
	M replies	Yes.		
	All this is repeated about a dozen times, as a game.			
; 10, 3 ge IIIa : stions erring absent ation).	Dialogue between C and M. C asks		dædi ?	Daddy ?
	M replies	Gone ta-ta.		
	C asks		kɑ ?	Carrie ?
	M replies	Kitchen. Where's Mummy ?		
	C, pointing to her		ɛ ɛ ɛ	
; 2, 3 ge IIIb : uch estions wed by tion).	M has been to see if Da (a playmate) was at home, and returns, saying	Da has gone ta-ta.		
	C asks		ɑːnti jɑ ?	Auntie there?
	M replies......................	Yes.		
	C		wɔːnt it ɑːnti. gouɑːsk hə.	Want (it) Auntie. Go ask her.
; 7, 9 ge IV : estions pendent action).	He has been out to tea the previous day with M To-day she has been out alone. When she returns, he asks........		Has Mummy been out to tea ?	

SERIES II.
INSTRUMENTAL USE OF EARLY SOUNDS.

Age.	*Circumstances.*	*Child's Speech.*
0 ; 10, 28	Sitting on M's lap, drops his toy dog. Makes effort to reach it, but is unsuccessful. Calls out rather excitedly	a a a
1 ; 0, 15	Drops one of his playthings, tries to reach it, but unsuccessfully. Calls out excitedly	ɛ ɛ ɛ
1 ; 1, 15	Tries to reach one of his favourite toys ; failing, he looks towards M, and calls out, in a series of sharp cries	a a a
1 ; 1, 26	During a meal, stretches out hand towards drink. When this is not immediately handed to him, says querulously	ɛ ɛ ɛ
1 ; 4, 2	Trying to reach his toy-rabbit, which is just beyond his play-pen	ɛ ɛ ɛ
1 ; 4, 8	On being wheeled by the house of friends, makes signs of glee, and cries out joyfully, stretching his hand out in the direction of the house	ɛ ɛ ɛ
1 ; 6 3	*See* Series I.	

SERIES III.
EARLY SPOKEN RESPONSES TO QUESTIONS.

Age.	*Circumstances.*	*Adult's Speech.*	*Child's Speech.*	*Conventional Equivalent.*
1 ; 6, 3	About bath-time, C climbs up stairs, M following him. At the landing, she asks C makes straight for the bathroom, saying	Where are you going ?	bɑ	bath.
1 ; 6, 25	There is no fruit to be seen. M asks C replies eagerly	Apple, baby ?	ɑ ɑ	apple, apple.
1 ; 7, 6	C takes up book. M says C replies	You won't tear it, will you ?	n ə	No.
1 ; 8, 22	F says C replies	Come to Daddy ?	nɔ:	No.
1 ; 8, 27	M asks C replies	Do you love Daddy ?	jeʃi:	Yes.
1 ; 9, 2	M asks C replies When she attempts to take him, in spite of his refusal, he struggles and cries.	Do you want to come on Mummy's bed ?	nɔ:	No.

SERIES IV.

REFERENCE TO ABSENT SITUATIONS, IN CONVERSATION.

Age.	*Circumstances.*	*Adult's Speech.*	*Child's Speech.*	*Conventional Equivalent.*
1 ; 4, 17	At breakfast-time, turning towards the cupboard where the honey, which he generally has at breakfast, is kept, says..........		hɑ.	honey.
1 ; 8, 24	C speaking to M, says appealingly :		gɔga	chocolate.
	M replies......................	When we go out.		
	C says		tata.	tata.
1 ; 8, 25	M, finding C with box which F had given him, asks	Who gave you that box ?	dæda.	Dadda.
1 ; 9, 2	Early in the morning in M's room ; C goes to door, rattles the handle, and says......................		ti : ti :	tea.
	Then adds		aii : aii :	Eileen.
	M asks......................	What will E bring us ?	ti :	tea.
	M continues	What else will E bring us ?	biki.	biscuits.
1 ; 10, 3	*See* Series I.			
1 ; 10, 15	M wheeling C in carriage ; C says :		hɔum.	home.
	M asks	Whom do you want to see ?	gæni.	Granny.

SERIES V.

TRANSITION TO THE INFORMATION-QUESTION.

Age.	*Circumstances.*	*Adult's Speech.*	*Child's Speech.*	*Conventional Equivalent.*
2 ; 2, 23	C looking through picture-book. Finds the picture of a Teddy-bear then shuts the book and says.... He repeats this many times.		edə kæn tedi ba : bi: ?	[Where]ever can Teddy-bear be ?
2 ; 3, 5	C plays game of hiding pencil in a book and saying...............		edə kæn u bi: likl pænʃu ?	[Where]ever can you be, little pencil ?
2 ; 4, 18	Looking for his toy, " Billy-boy."		biji bɔi, wɛə ga:ki put it ? wɛə iz it ?	Billy-boy, where Garkie put it ? Where is it ?
2 ; 4, 19	Playing with his train, looking for the string		vɛəz ə kiŋ ?	Where's the string ?
2 ; 4, 26	Trying to put on his pants......		vitʃ iz δ bæk æn fwʌnt ?	Which is the back and front?
2 ; 5, 0	A strip of felt has fallen from F's hat ; C, who has not noticed him replace it, asks :		var iz it ?	Where is it ?
	When it is shown to him, he says		dær it iz.	There it is !
2 ; 5, 24	F had sewn the ears on to C's toy dog. C asks		hu ʃoud iəz ɔn gɔgi ?	Who sewed ears on Goggie ?
	M, by way of reply, asks	Who ?		
	C		dædi.	Daddy.
2 ; 6, 17	Plays the game of " counting," i.e., naming things		kud mʌmi kaunt dis æn dis ?	Could Mummy count this and this ?
	M	You count first.		
	C points and asks		wɔt iz it ?	What is it ?
	M	What ?		
	C		mu:k	milk.
	All this is repeated, with several objects.			
2 ; 7, 6	M has been to London, yesterday. This morning C asks		hʌlo mʌmi. mʌmi bi:n tu: Lʌndən ? tu si : də kri:n.	Hullo Mummy. Mummy been to London ? To see the Queen.
2 ; 7, 9	*See* Series I.			

SERIES VI.

INFORMATION-QUESTIONS.

Class (*a*) : Where ?-questions.
Class (*b*) : Naming-questions.
Class (*c*) : Source or goal questions.
Class (*d*) : Why ?-questions.

Age.	*Circumstances.*	*Adult's Speech.*	*Child's Speech.*	*Class.*
2 ; 7, 8	M and C going to meet Da. C (suddenly)		Where shall we meet ? Where shall we meet Da ?	(*a*)
2 ; 7, 15	Pointing to word after word in book of nursery rhymes		What does this say ?	(*b*)
2 ; 7, 24	Having built a wall with his bricks		Must not break this, 'cause[K] made it.	
2 ; 8, 2(i)	Picking up an apple with an odd swelling		What's that ?	(*b*)
	M	A bump.		
2 ; 8, 2(ii)	He enjoys playing this game		When do we get soap ?	(*c*)
	M	B—'s.		
	C		Where's B—'s?	(*a*)
	M	In Town.		
	C		Where's Town?	
	M	You go there in the pram.		
	C		Where's pram ?	
	M	In the garden.		
	C		Where's the garden ?	
	M (pretending to scold)	Oh, be quiet !		
	C		Where's quiet?	
2 ; 8, 12	Seeing M in a green dress		Is that green ?	(*b*)
	M	Yes.		
	C		Who bought that frock ?	(*c*)
	M	Mummie.		
	C (who had accompanied the maid when she called for the dress)		No, Lily.	
2 ; 8, 30	Indicating the pages of a letter, fastened together		Who did these up ?	(*c*)
	F	Someone or other.		
	C		Did the postman do these up ?	
2 ; 9, 0	C		Can we have tea in the park to-day ?	
	M	Not to-day... Perhaps on Sunday. Perhaps Lily will come too.		
	C		Lily can't come.	
	M	Why ?		
	C (Lily is the maid, visited by George on Sundays)............		'Cause of George	

SERIES VI—*continued.*

Age.	*Circumstances.*	*Adult's Speech.*	*Child's Speech.*	*Class.*
2 ; 9, 3(i)	C		Do you know where R's bicycle is ?	(*a*)
	M	No.		
	C		R's bicycle is at Auntie M's.	
2 ; 9, 3(ii)	F enters C's room in morning, waking him. C		Where's Mummy ?	(*a*)
	F	In bed.		
	C		I want to say good morning.	
2 ; 9, 7	It is raining hard. C		Mummy, make it stop raining.	
	M	I'm afraid I can't.		
	C		Why can't you ?	(*d*)
2 ; 9, 9	Seeing F in bed with his arms under his head		What you lying like that for, Daddy ?	(*d*)
	Seeing F putting on his spectacles		What you putting those glasses on for?	(*d*)
2 ; 9, 23	Looking at a child riding a bicycle		What do Kathleen's bicycle wheels go round for ?	(*d*)
2 ; 10, 12	In the street, watching trams and buses		Where's that tram going ?	(*c*)
	M	To Town.		
	C (referring to a cafe)		To Mikado ?	
	M	Yes.		
	C		Is that bus going to the swimming-baths ?	
	M	Yes.		
2 ; 10, 18	While eating soup		Mummy, why do we use a spoon ?	(*d*)
	M	Why ?		
	C		'Cause we can't drink it with our hands.	

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RÉSUMÉ.

L'ORIGINE, ET LE RÔLE PRIMITIF DES QUESTIONS DANS LE LANGAGE ENFANTIN.

On a consacré beaucoup d'attention aux questions des enfants par rapport au développement de l'intelligence. Le but de cet article est de considérer les premières étapes. Comment un enfant vient-il à poser des questions ; quelle est leur importance dans son activité linguistique ; comment s'en sert-il ? Une série d'observations d'un seul enfant révèle les traits suivants de son développement :

(1) Les questions sont une mode d'activité, un moyen de s'assurer la coopération sociale.

(2) Cette coopération sociale est exigée par l'enfant :
  (a) comme une forme du jeu,
  (b) dans l'effort de satisfaire à ses besoins.

(3) Le développement se produit par les étapes suivantes :
  I.—La demande des rapports linguistiques.
  II.—Les questions ayant rapport à la situateon actuelle.
  III.—Les questions ayant rapport à des situations absentes.
  IV.—Les questions ayant pour but d'obtenir " des renseignements."

(4) On ne peut tracer aucune ligne marquée entre l'emploi des questions comme une activité préliminaire et leur emploi, à l'étape IV, comme un moyen d'augmenter les connaissances de l'enfant. Comme, plutôt l'enfant cherche l'aide social pour s'adapter à son milieu corporel, ainsi ; plus tard il cherche l'aide social pour caser dans des formules linguistiques le monde au delà de ses expériences corporelles.

ZUSAMMENFASSUNG.

DIE ANSÄTZE UND FRÜHEN FUNKTIONEN DER FRAGEN IN DER SPRACHE DES KINDES.

Man hat den Fragen der Kinder im Verhältnis zur geistigen Bildung viel Beachtung geschenkt. Dieser Artikel behandelt die frühen Stadien. Wie kommt ein Kind dazu, Fragen zu benutzen ; welchen Platz nehmen sie in seiner Sprechfähigkeit ein ; zu welchem Zweck verwendet es sie ? Reihenweise geordnete Beobachtungen eines besonderen Kindes offenbaren folgende Eigenschaften seiner Entwicklung :

(1) Fragen sind eine Art zu handeln, ein Mittel Mitarbeit in der Gemeinschaft zu erlangen.

(2) Diese Mitarbeit wird vom Kind verlangt :
  (a) als Spielform,
  (b) im Versuch, seine Wünsche zu erfüllen.

(3) Die Entwicklung kommt in den folgenden Stufen vor :
  I.—Das Verlangen nach sprachlichem Umgang.
  II.—Fragen zu Situationen, die in der Gegenwart liegen.
  III.—Fragen zu Situationen, die in der Vergangenheit liegen.
  IV.—Fragen, die Auskunft ermitteln sollen.

(4) Man kann keinen scharfen Unterschied zwischen der Verwendung von Fragen als Vorstufe zum Handeln machen, und ihrer Verwendung in Stadium IV als Mittel der Erweiterung kindlicher Kenntnisse. Eben wie das Kind zuerst soziale Hilfe in seinem Umgang mit seiner körperlichen Umgebung sucht, so sucht es sie später, um eine sprachliche Formulierung der Welt ausserhalb seiner körperlichen Erfahrung zu machen.

THE COMPARATIVE EFFECT ON SCHOOL PROGRESS OF (*a*) MANY SHORT AND (*b*) ONE LONG ABSENCE IN A SECONDARY SCHOOL.

BY FRANK SANDON.

I.—*Introduction.*

II.—*The data.*

III.—*Data analysed by duration of absence and by number of spells.*

IV.—*Summary and conclusions.*

I.—INTRODUCTION.

THE writer recently investigated some actuarial aspects of secondary school absence.[1] Among the absences arising in an experience of some 250,000 pupil-sessions at risk, mostly of pandemic sickness, one of the most striking features was the rapid recovery of the cases. Well over 50 per cent of the adolescents concerned were back at school within a day. A further point of interest arose in the sessional fluctuations of absence. The numbers of first and last absences on various sessions (half-days) fluctuated very widely, but this feature was found to be due very largely to certain actuarial considerations, and the actual fluctuation in the total number absent at any one session was small. This last was, however, definite, and indicated, e.g., a tendency to see the day or the week out before returning after sickness. One would naturally expect that after a protracted absence a pupil would be educationally retarded; it is therefore of interest to examine the relative effects on a pupil's progress of (*a*) retardation due to missed lessons during a long absence, and (*b*) the psychological attitudes indicated by a tendency to prolong an absence beyond the period of true recovery.

II.—THE DATA.

The absences of all the boys (about 150) in a mixed secondary school throughout an academic year (about 360 sessions) were therefore examined in relation to the pupils' academic standing *in the term following* their absence. (During their absence, of course, they were liable to miss tests, etc.; we wished to see how far their absence showed more permanent marks of retarded progress.) The 406 different cases gave rise to the following table.

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[1] See end of this paper for references.

TABLE I.

THE RELATION BETWEEN NUMBER OF SPELLS OF ABSENCE PER TERM AND THE TOTAL DURATION OF ABSENCE PER TERM.

		Spells of Absence.				
		0	1	2	3 *to* 6	*Total.*
Duration* in Days.	0............	208	—	—	—	208
	1–5	—	84	24	7	115
	6–16	—	16	20	18	54
	17 and over ..	—	19	7	3	29
	Total	208	119	51	28	406

The relation between the number of spells and the total duration as shown in the table is clearly anomalous. The first row and the first column of entries of the table must both be empty except for the entries in the cell (0, 0). On the other hand, although, on the whole, the more the spells of absence the more the total duration of absence, yet one very long spell would mean so much of the term taken that there would be no room for any more spells later on in that term. This is, perhaps, indicated in the table by the fact that the modal number of sessions absent for different durations increases from 1 for a very short total duration to 2 for medium total duration, and back to 1 for the largest duration. On the whole the greater the number of spells the larger the total duration : the mode here passes from the 84 entry (short duration) for one spell to the 18 entry (medium duration) for the largest number of spells.

III.—DATA ANALYSED BY DURATION OF ABSENCE AND BY NUMBER OF SPELLS.

We proceed to investigate more closely the relation with secondary school progress (as measured, be it remembered, by the next term's mark†.

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* In the paper already referred to, it is shown that the sum of sessions is not altogether the best way of measuring duration. We use sessions, however, as the alternative (corrected calendar duration) is too heavy and complicated for ordinary computation.

† The compilation of marks for the school in question is given in reference[2]; we correct our marks to A form standard.

TABLE II.

THE RELATION BETWEEN MARK AND TOTAL DURATION.

School Mark.	*Total Duration of Absences (Sessions).*						*Total.*
	0	1–5	6–16	17–34	35–69	70 & over	
25—	—	—	—	1	—	—	1
30—	1	1	—	1	1	—	4
35—	2	4	8	1	1	1	17
40—	15	12	10	3	—	—	40
45—	27	26	10	3	2	—	68
50—	40	24	8	2	2	2	78
55—	42	17	13	4	1	—	77
60—	38	21	3	1	1	—	64
65—	27	8	1	1	—	1	38
70—	10	1	1	—	—	—	12
75—	2	1	—	—	—	—	3
80—	4	—	—	—	—	—	4
Total ..	208	115	54	17	8	4	406
Mean ..	57·0	53·1	49·4	48·5^{-}	48·3	52·0	54·3
S.D. ..	9·2	8·5^{+}	8·5^{+}	10·4	9·3	10·6	9·5

The distribution both of spells and of duration is pronouncedly J-shaped and the absences of all but 54 boys are both infrequent (0, 1, or 2 spells) and unprotracted (0 to 16 sessions). By arranging the distribution of durations as shown in Tables II and III, we have practically the same marginal frequencies for the various arrays of duration as for the various spells. We note from Table II that in each case the pupils who are never absent score definitely the higher average. This is to be expected; common sense says that absence does hinder progress. But the remarkable thing is that it does not hinder it in the way that we might expect. We should, I think, expect that the longer the total absence the worse the mark. Yet the series of average marks, 53·1, 49·4, 48·5, 48·3, 52·0, shows that the tendency this way is very feeble. On the other hand, the average mark falls rapidly with the increase in the number of spells of

TABLE III.

THE RELATION BETWEEN MARK AND NUMBER OF SPELLS OF ABSENCE.

School Mark.	*Number of Spells of Absence.*						*Total.*
	0	1	2	3	4	5 and 6	
25—	—	—	—	—	—	1	1
30—	1	1	1	—	—	1	4
35—	2	6	4	1	3	1	17
40—	15	10	8	5	2	—	40
45—	27	24	11	5	1	—	68
50—	40	25	9	3	1	—	78
55—	42	21	10	3	—	1	77
60—	38	21	5	—	—	—	64
65—	27	9	2	—	—	—	38
70—	10	2	—	—	—	—	12
75—	2	—	1	—	—	—	3
80—	4	—	—	—	—	—	4
Total ..	208	119	51	17	7	4	406
Mean ..	57·0	53·3	50·8	47·6	42·0	38·3	54·3
S.D. ..	9·2	8·5^{-}	9·0	5·9	5·3	11·4	9·5

absence (Table III). In addition, the standard deviation also falls markedly (the 11·4 of the last array is due to the one exceptional case at 55 marks); the frequently absent are not merely low scorers next term on the whole, but they will approximate closer to their low average. The correlation ratio, η, for marks with absence for the last four arrays is, in the case of spells, 0·39 and only 0·26 in the case of duration: the chance against this difference not being fortuitous is only about 4 per cent. This is on selected material; the difference would be more pronounced on unselected[3]. We may therefore conclude that the relation between never absent and high score is more a psychological one of attitude to school work, or a physical one of general fitness, than one of non-retardation due to not missing any lessons.

In other words, absence, preferably recorded in spells, will serve as a useful and fairly reliable guide to some of the factors that will make for a child's success in a secondary school. In view of the Board of Education's Supplementary Memorandum on Examinations[4] (School Records, para. 3) we may alternatively put the result in another form that may be of value. In a pupil's school record enter, for each term, not merely his total absences (i.e., number of sessions absent) but also the number of spells of absence. The pupil with an undue number of the latter will probably be lacking in some of the qualities that make for success in the secondary school.

IV.—SUMMARY AND CONCLUSIONS.

There is, in a number of secondary school pupils, a psychological or physical constitution that results in poor progress being associated with frequent absence, so much so that frequent short spells of absence are related with educational retardation more than are less frequent longer spells of much greater total duration.

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RÉSUMÉ.

L'EFFET RELATIF SUR LE PROGRÈS SCOLAIRE DE (A) BEAUCOUP DE COURTES ABSENCES, ET (B) UND LONGUE ABSENCE, DANS UN LYCÉE.

Le nombre d'absences par trimestre d'environ 150 élèves fut examiné pendant trois trimestres successifs. On avait noté 198 garçons qui avaient été absents au moins une fois ; pour tous les garçons, sauf 54, les absences étaient et peu fréquentes et de courte durée. L'effet sur le niveau de l'accomplissement scolaire des élèves, pendant le trimestre suivant l'absence, fut calculé sur les notes scolaires de ce trimestre. Les élèves qui n'avaient jamais été absents obtinrent, naturellement, des notes plus élevées. Mais il n'y a aucune diminution marquée dans les notes pour correspondre à une absence prolongée, tandisque les notes diminuent rapidement avec une augmentation du nombre des périodes d'absence. Nous en concluons, donc, en général que le rapport entre l'absence et le progrès n'est pas le résultat des classes manquées, et l'on suggère qu'un nombre élevé de périodes d'absence indique quelque défaut de caractère.

ZUSAMMENFASSUNG.

DIE RELATIVE WIRKUNG AUF DIE SCHULLEISTUNG VON: (A) HÄUFIGEM, KURZEN, UND, (B) EINEM LANGEN FEHLEN IN EINER HÖHEREN SCHULE.

Das Fehlen pro Semester von etwa 150 Knaben an höheren Schulen wurden für die Dauer von drei aufeinanderfolgenden Semestern untersucht. 198 Fälle wurden verzeichnet, wo die Knaben mindestens einmal gefehlt hatten: für alle ausser 54 Knaben war das Fehlen zugleich selten und kurz. Die Wirkung auf die Stellung der Schüler in der Klasse im Semester nach ihrer Abwesenheit wurde nach der vorhergehenden Bewertung gemessen. Die Schüler, die nie gefehlt hatten, bekamen natürlicherweise die bessere Bewertung. Aber es zeigt sich kein bestimmtes Sinken der Bewertung mit zunehmender Länge des Fehlens, obgleich die Note rasch herabsinkt, wenn das Fehlen häufiger wird. Wir schliessen, dass das Verhältnis zwischen Fehlen und Fortschritt nicht hauptsächlich auf versäumte Stunden zurückzurufen ist, und es wird darauf hingewiesen, dass häufigeres Fehlen irgend einen Mangel im Charakter andeutet.

PERSEVERATION IN RELATION TO REMINISCENCE AND RECALL.*

By GEORGE FORLANO AND LILY BRUNSCHWIG
(*Teachers' College, Columbia University*).

I.

I.—*Introduction to the problem.*
II.—*The subjects.*
III.—*Procedure* : (*a*) *Experimental method.*
  (*b*) *Scoring of the tests.*
IV.—*Results* : (*a*) *Test scores.*
  (*b*) *Retention test score correlated with the perseveration quotient.*
  (*c*) *Comparisons of the perseverative tendency of groups classified on the bases of improvement on the delayed retention tests and of reported intervenient rehearsal.*
V.—*Summary.*
Bibliography.

I.—INTRODUCTION TO THE PROBLEM.

AT present relatively little definite information is available about the factors underlying reminiscence or the conditions associated with it. McGeoch,[10] in a review of previous work in this field, points out that the results from a number of studies on this subject have been rendered inconclusive because equivocal methods were employed for the measurement of reminiscence.

The present study is concerned with the relationship between perseverative tendency and reminiscence and the improvement in recall where intervenient rehearsal is involved. A number of views have been advanced which suggest the probability of a functional relationship between perseveration and reminiscence. For instance, Ballard,[1] in his search for possible explanations of reminiscence, mentions that reminiscence may be due to an inertia of the nervous system, resulting in a continuing "neural growth" after the process of active learning has ceased. Brown[2] stated that "perseveration and the factors which operate in the consolidation of dispersed learning and in the upbuilding

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*The authors wish to thank Professor Rudolf Pintner and Dr. Julius B. Maller for helpful suggestions.

of motor habits in the intervals between practices . . . should all be considered . . . in relation to reminiscence."

Definitions of perseveration cover to some extent similar ground by making reference also to inertia. Thus Lankes[8] subsumes under the term perseveration "the continuance, sub-conscious, or even completely unconscious and purely physiological of the effect of a past experience." Rogers[13] states that "perseveration is indirectly manifested in the realm of mental content, and the effect is usually appreciated as 'interference,' 'inhibition,' or 'carry-over.'" Stephenson[15] maintains that for an adequate explanation of perseveration four theories need to be considered: "The first is the theory of continuance and hindrance effect. The second is that *p*-factor supplies a direct measurement of character qualities. . . . The third theory suggests that the so-called individual differences in continuance effects are better regarded as dependent upon an intrinsic 'will' function. The second and third theories mean that not perseveration, but either habitual modes of conduct, or conscious or unconscious control, inhibition and co-ordination are the critical processes entering *p*-tests. The fourth theory is that, frequently, mental 'set' explains *p*-scores."

Furthermore, Stephenson believes that all *p*-measurements should be examined "from the point of view of the theory of extraneous mediation of *w*-characteristics. Then, with increasing perfected testing technique, the other theories become more and more significant." The studies of Cattell,[3] Pinard,[11] [12], Stephenson,[14] Kendig,[6] [7], reveal that measurements of perseveration are related to differences of personality and certain pathological conditions. It is important to note here that further research may show the relation of perseveration scores derived from the Maller-Elkin test, the test employed in the present study, to other measures of perseveration, especially those used in the studies just mentioned. In this way, a broader base will be given this new approach to the complicated problem of reminiscence by way of *p*-measurements.

II.—THE SUBJECTS.

The subjects of the present study were 156 boys and girls in the fifth and sixth grades of a suburban New York City public elementary school. The range of the subjects in chronological age was from eight to fourteen years, in mental age from eight to sixteen years, and in I.Q. from 68 to 159. The respective means are 10-7 in chronological age, 11-8 in mental age, and 116 in I.Q. The National Intelligence Test was the measure of intelligence employed.

III.—PROCEDURE.

(*a*) *Experimental method.*

All of the experimental work with pupils was accomplished in their regular classrooms during school hours.

Five four-line stanzas from Padraic Colum's poem *The Drover* constituted the learning material. This poem, which is generally not included in children's reading lists, was chosen in order to have material that would be new to all or most of the subjects.

A part method of learning was employed. Each pupil was given a mimeographed sheet containing the twenty lines to be studied and a blank manilla card. Subjects were instructed to cover the poem with the card and to expose in turn each stanza to be learned. Beginning with the first stanza, the examiner read each one aloud, and then allotted ninety seconds for free silent study of that stanza before proceeding to the next one. After the five stanzas had been studied in this fashion the pupils were given ninety seconds for re-reading the poem as a whole.

The results of the learning period were measured by an immediate retention test, followed twenty-four hours later by a delayed retention test. On both of these tests subjects were required to give in writing as much of the learning material as they could. In accord with McGeoch's[10] definition of reminiscence " as the improvement in the recall of incompletely learned material after an interval of time without intervenient formal relearning or review," we asked the following questions at the conclusion of the delayed retention test:

(1) Had you ever heard or read the poem before it was given to you yesterday?

(2) Did you read or see the poem between the time you studied it yesterday and the test you had to-day?

(3) Did you talk about the poem between the time you studied it yesterday and the test you had to-day?

(4) Did you think about the poem between yesterday and to-day? If you tried to say some of its lines to yourself, or tried to remember parts or all of it, answer 'yes' to this question.

Each of these questions was carefully explained, and pupils were told that their replies would not affect their school marks.

The Maller-Elkin Attention Test[9] for the measurement of perseveration was given last.

(*b*) *Scoring of the tests.*

The retention tests were scored in two different ways. The W-score consists of a count of the total number of words correctly placed in their respective lines. One point was subtracted for each incorrect substitution of a word and for each insertion of an additional word beyond the number of words belonging in the line. The S-score consists of the total number of lines correctly reproduced as to sense.

The reliability coefficient of the immediate retention test obtained by correlating the scores of the odd and even numbered lines and corrected by the Spearman-Brown prophecy formula, is ·96 for the W-score and ·93 for the S-score. The correlation of W-score with S-score is ·96 on the immediate retention test and ·95 on the delayed retention test. The r between the W-scores on the immediate and the delayed retention tests is ·92, while that between the S-scores from these two retention tests is ·87.

The Maller-Elkin Attention Test is a group test "to measure individual differences in perseveration, i.e., the tendency of mental processes to lag." The test material consists of problems in addition and subtraction and tasks of writing letters and of drawing lines. The initial score summarizes the individual's speed of work in each of these tasks. The final score is based on the speed in these identical tasks, presented in varying combinations so as to require the subject to shift rapidly from one operation to another. The score on the Attention Test, referred to as the Perseveration Quotient or P.Q., is the ratio of final score to initial score. Therefore, *low P.Q.s are indicative of high perseverative tendency, and high P.Q.s of low perseverative tendency*. Perseveration in terms of this test is manifested by lag of a previous activity and hence by difficulty in shifting from one activity to another. The re-test reliability of the perseveration test obtained from the P.Q. scores of 100 children ranging in age from 12 to 16 years is ·74.

IV.—RESULTS.

(*a*) *Test scores.*

A statistical summary of results from the retention tests is given in Table I. The mean, the standard deviation, and the range of scores are included. The DR-IR test score is obtained for each subject by subtracting the score on the immediate retention test from the score on the delayed retention test. From this it follows that positive DR-IR scores may be indicative of reminiscence, and that negative scores point to obliviscence.

As indicated in Table I, the mean scores on the immediate and delayed retention tests for W and S scores respectively are almost identical. The mean on the delayed retention test is a little higher for W-scores and a little lower for S-scores than the corresponding means on the immediate retention tests.

TABLE I.

MEANS OF THE IMMEDIATE AND DELAYED RETENTION TESTS, AND MEAN DIFFERENCES BETWEEN DELAYED AND IMMEDIATE RETENTION TESTS IN TERMS OF W- AND S- SCORES.

Measure.	*Mean.*	*S.D.*	*Range.*
Immediate Retention :			
W-Score	57·36	22·40	5 – 110
S-Score	12·04	4·44	0 – 20
Delayed Retention :			
W-Score	57·40	23·37	1 – 110
S-Score	11·72	4·90	0 – 20
Delayed Immediate Retention:			
W-Score	+ 0·04	9·06	(–29) – (+30)
S-Score	– 0·32	2·10	(– 6) – (+ 5)

A study of the scores reveals that on the delayed retention test 44 per cent show improvement in S-score. The mean gain by these subjects on the delayed retention test in W-score is 8·29 words with a standard deviation of 5·91, and in S-scores 2·31 lines with a standard deviation of 1·28.

The mean perseveration quotient (P.Q.) obtained from the Maller-Elkin Attention Test is 64·52 and the S.D. 7·42.

(*b*) *Retention test scores correlated with the preseveration quotient.*

Pearson product moment *r's* computed between DR-IR scores and P.Q.'s are shown in Table II. The *r's* are low and consistently negative.

TABLE II.

PERSEVERATION QUOTIENT CORRELATED WITH RETENTION TEST SCORE.

	r	*Eta x y*	*Eta y x*
Delayed Retention Score Minus Immediate Retention Score :			
W-Score	– ·116 ± ·053	·248 ± ·051	·337 ± ·048
S-Score	– ·083 ± ·053	·233 ± ·051	·248 ± ·051

To ascertain the possibility of a non-linear relationship between DR-IR score and P.Q.'s correlation ratios were computed. The ratio of zeta ($eta^2 - r^2$) to the probable error of zeta ranges for the four etas from 2·03 to 2·86, indicating that there are from ninety-one to ninety-seven chances out of one hundred that the relationhsip between P.Q. and DR-IR score is curvilinear rather than linear. As the etas amount to more than four times their respective P.E.'s a statistically reliable curvilinear relationship between perseveration and DR-IR score is indicated. In other words, subjects who improve on the delayed retention test manifest a greater degree of perseveration than subjects who show no improvement in delayed retention.

(c) *Comparisons of the perseverative tendency of groups classified on the bases of improvement on the delayed retention tests and of reported intervenient rehearsal.*

The 156 cases were now classified under three main headings, namely, A.—Total Group, B.—Rehearsing Group, and C.—Non-rehearsing Group. Under each of these main classifications cases were sub-divided into contrasting groups on the basis of whether or not there had been improvement on the delayed retention test.

The figures in Table III give the number of cases for each sub-group, the mean P.Q., the standard deviation, the difference between the means of contrasted groups, the standard error of the mean difference, and the ratio of the mean difference to its standard error. Under each main classification sub-groups 1 and 3 refer to the cases which show improvement in W- and in S-scores respectively.

Comparisons of the sub-groups under the classification A.—Total Group, indicate that sub-groups A1 and A3, that is, those pupils whose delayed retentions test scores show improvement, have on the average a slightly greater tendency toward perseveration than sub-groups A2 and A4, which are composed of subjects showing no gain or else a loss on the delayed retention test. The standard ratio* of the difference between the group showing improvement and the group showing no improvement, is slightly greater when subjects are classified on the basis of W-score than on the basis of S-score. However, in neither comparison is the ratio large enough to be statistically reliable.

Group A was divided into Groups B and C on the basis of whether or not subjects reported having rehearsed the learning material during the 24-hour interval between the immediate and the delayed retention

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* The ratio of the mean difference to the standard error of the mean difference is here termed the standard ratio.

TABLE III.

RELIABILITY OF MEAN DIFFERENCES IN P.Q. OF GROUPS COMPARED ON THE BASIS OF IMPROVEMENT ON THE DELAYED RETENTION TEST AND OF INTERVENIENT REHEARSAL.

	Number of Cases.	*Mean P.Q.*	*S.D.*	*d Mean.*	*S.D. d.*	$\frac{d}{S.D._{d}}$
A.—TOTAL GROUP—						
Sub-Group :						
(1) Improvement in W-Score	69	63·65	7·14			
(2) No Improvement in W-Score	87	65·24	7·04	1·59	1·14	1·43
(3) Improvement in S-Score	56	63·79	7·12			
(4) No Improvement in S-Score	100	64·96	7·09	1·17	1·19	·99
B.—REHEARSING GROUP—						
Sub-Group :						
(1) Improvement in W-Score	45	64·35	6·52			
(2) No Improvement in W-Score	50	66·04	6·72	1·69	1·36	1·24
(3) Improvement in S-Score	34	63·67	6·52			
(4) No Improvement in S-Score	61	66·10	6·65	2·43	1·37	1·77
C.—NON-RESEARSING GROUP—						
Sub-Group :						
(1) Improvement in W-Score	24	62·88	8·16			
(2) No Improvement in W-Score	37	64·16	7·27	1·28	2·02	0·63
(3) Improvement in S-Score	22	64·38	8·39			
(4) No Improvement in S-Score	39	63·23	7·33	1·15	2·17	−0·53

tests. Rehearsal was assumed to have taken place if subjects answered affirmatively Question 4 (see page 180, III (A) as above). None of the subjects answered Question 1 in the affirmative, therefore no pupils had to be eliminated because of previous familiarity with the learning material.

As indicated in Table III more perseveration is shown within the rehearsing group by Sub-groups B1 and B3, that is, by the groups which improved on the delayed retention test, than by Sub-group B2 and B4, which did not improve on the delayed retention test. In Group C, which consists of subjects who reported that they did not engage in intervenient recall, improvement on the delayed retention test is synonymous with reminiscence. Here the standard ratios between the mean P.Q.'s of the reminiscing group and of the non-reminiscing group are practically negligible. Pupils grouped under C1, the reminiscing group on the basis of W-score, show more perseveration than the non-reminiscing pupils. Sub-group C3, the reminiscing group on the basis of S-score, shows on the other hand somewhat less perseveration than the corresponding reminiscing group C4. This is the only comparison out of the six in which the subjects who gain on the delayed retention test do not also have a mean score indicative of more perseveration than the group of subjects showing no gain on the delayed retention test.

In summary, therefore, the results obtained from comparisons of groups indicate with but one exception a positive but not statistically reliable relation between perseveration and improvement in recall on the delayed retention test.

V.—SUMMARY.

In the present investigation perseverative tendency in elementary school children was studied in relation to reminiscence and improvement in recall on a delayed retention test when intervenient rehearsal was reported to have occurred.

From 36 to 44 per cent of the subjects, the percentage depending on the method of scoring, showed a higher score on the delayed than on the immediate retention test.

Low, but consistently positive correlations, were found between improvement on the delayed retention test and perseverative tendency. Pupils who showed improvement on the delayed retention test averaged somewhat higher in perseverative tendency than those who did not show improvement ; a difference in this direction was found within the total group of subjects and within sub-groups classified on the basis of reported rehearsal and non-rehearsal. These differences were for the most part slight.

Except for the conflicting findings within the non-rehearsing group on the relationship of reminiscence and perseveration, the remaining data presented in this paper suggest a possible relationship between perseveration and improvement on a delayed retention test. This relationship, however, has shown itself to be statistically reliable.

Further research is suggested to explore the nature and extent of such a relationship. This requires a study of the occurrence of reminiscence under different conditions, and the application of varied and more intensive measures of perseveration upon larger groups. Moreover, the relationship observed in the present study between perseveration and improvement in delayed recall is too slight to controvert definitely explanations of the occurrence of reminiscence (cf. Brown), which are not based on the assumption of mental lag.

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RÉSUMÉ.

LA PERSÉVÉRANCE PAR SON RAPPORT À LA REMINISCENCE ET À L'ÉVOCATION.

Dans cette recherche l'on étudia la tendance à la persévérance chez 156 élèves, garçons et filles, par son rapport à la reminiscence et à l'amélioration de l'évocation, dans un test retention de différé lorsqu'une répétition avait eu lieu dans l'intervalle. Les élèves, à qui l'on accorda douze minutes, à peu près, pour apprendre par cœur cinq strophes de quatre vers chacune du poème de Padraic Colum, " Le Bouvier," employèrent une variation de la méthode d'apprendre par sections. Les résultats de cette étude furent calculés au moyen d'un test de retention immédiat, suivi, vingt-quatre heures plus tard, par un test de retention différé. A la fin du test différé l'on appliqua à tous les élèves le Test de Persévérance Mather-Ekin. Pour chaque sujet l'on retrancha le nombre des points du test immédiat de celui du test différé. Des différences positives entre les points du test différé et ceux du test immédiat furent considérées comme indiquant la reminiscence, pourvu que l'amélioration dans l'évocation après l'intervalle de 24 heures fût accomplie sans que le sujet eût repassé ou répété le poème. En général les données présentées dans cette article suggèrent un rapport positif, bas mais valable du point de vue statistique, entre la persévérance et l'amélioration dans un test de retention différé. Les conclusions étaient contradictoires quant au rapport entre la reminiscence, telle qu'on l'a définie dans cette étude, et la persévérance.

ZUSAMMENFASSUNG.

PERSEVERATION IM ZUSAMMENHANG MIT ERINNERUNG UND DEM ZURÜCKRUFEN INS GEDÄCHTNIS.

In dieser Untersuchung prüfte man bei 156 Schülern und Schülerinnen Perseverationstendenzen im Verhältnis zu Erinnerung und Zurückrufen in einem Test verzögerter Erinnerung, wo inzwischen eine Wiederholung stattgefunden hatte. Ein Variieren der Teilmethode des Lernens wurde von den Schülern benutzt, denen man etwa 12 Minuten gab, um fünf vierzeilige Strophen aus Padraic Colums Gedicht " The Drover " auswendig zu lernen. Die Ergebnisse der Lernzeit wurden durch einen Test für unmittelbare Zurückrufung gemessen, worauf 24 Stunden später ein Test für verzögerte Zurückrufung folgte. Am Schluss des Tests für verzögerte Zurückrufung gab man allen Schülern den Maller-Elkin-Perseverationstest. Für jede Vp. zog man das Ergebnis im Test für unmittelbare Zurückrufung vom Ergebnis des Tests für verzögerte Zurückrufung ab. Positive Unterschiede zwischen den Ergebnissen für verzögerte und unmittelbare Zurückrufung hielt man für Zurückrufungsmerkmale, vorausgesetzt, dass die Fortschritte im Zurückrufen nach einer Pause von 24 Studen ohne dazwischenkommende Wiedererlernung oder Wiederholung seitens der Vp. geschah. Im allgemeinen weisen die in diesem Artikel gebotenen Angaben auf ein niedriges, aber statistisch zuverlässiges Verhältnis hin zwischen Perseveration und dem Fortschritt bei einem Test für verzögerte Zurückrufung. Die Resultate widersprachen sich in Bezug auf das Verhältnis zwischen Zurückrufung, wie sie in diesem Artikel bestimmt wird, und Perseveration.

A STUDY OF THE BEGINNINGS AND SIGNIFICANCE OF PLAY IN INFANCY.

By C. W. VALENTINE.

Part I.

I.—*The definition of play applied to infant activities.*
II.—*The first forms of play.*
III.—*Play between six and twelve months.*
IV.—*Play between twelve and eighteen months.*
  Play with imaginary objects.
  Play at new and difficult bodily performances.
  Social play.
  Imitative play.
  Repetition in play.

I.—The definition of play applied to infant activities.

In endeavouring to trace the first beginnings of play in the infant we are met with a difficulty we generally meet when trying to apply to the earliest stages of mental life a definition framed for a more mature level. We may start with a definition of play as " any activity which is carried out entirely for its own sake."[1] This, of course, does not rule out the validity of the theory of Groos that play is biologically valuable as a preparation for more serious activities of life later on. Nor indeed does it rule out entirely Herbert Spencer's theory that play is an outlet for excess of energy, that is if we refer the " excess of energy " only to the particular special impulse or interest, which may be consistent with a considerable degree of *general* fatigue. Neither do we rule out entirely the theory of play as a biological repetition, in the young, of activities as they have developed in the race. For there is normally delight in an activity indulged in for its own sake, all successful activity indeed tending to be pleasurable; and such delight is likely to be specially strong in the successful performance of some new activity or the experience of some new capacity. Hence there will tend to be play with each capacity or innate impulse as it develops partly because of its mere novelty; and here we see an element of truth in the theory of play as biological repetition.

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[1] I have given reasons for adopting this definition in the section on "Educational Psychology in the United Kingdom."—*Year Book of Education*, 1936, p. 313.

We must however add a proviso to our definition. The satisfaction of bodily needs such as hunger is not a form of play; though the gourmand in eating for eating's sake comes near to a form of play. Similarly the stretching of a stiff limb may be performed for its own sake—it is enjoyed; but we should hardly call it play. It is done primarily to get rid of an unpleasant sensation. Yet even in play proper we cannot always say the pleasure of the action is not at all dependent on previous conditions—for example the enjoyment of golf after close confinement. The added pleasure due to this, however, is not an *essential* element. We must distinguish mere exercise for health and play proper; play even when it helps development is to use Groos's phrase " unintentional self-development."[1]

Finally, when we say the activity is an end in itself we must not forget that it may be directed towards some end or object which itself forms part of the play interest, for example in the making of a man with plasticine or the building of a sand castle. The activity is more worthwhile because it produces the man or the castle. But the process of making is part of the true play, when, as so often, the child prefers to make it himself instead of having it made for him.

With this general definition then as our guide we may ask " When do we find the first play and of what kind is it in the earliest years? " As a contribution to this topic I shall report here some of the observations made on my own five children from the earliest months over a period of some twenty years. The children will be referred to as A, B and C (boys), X and Y (girls), alphabetical order not indicating order of birth necessarily.

The diary notes here reproduced were made partly on Y, but especially on B, of whom there was in the early stages daily and almost hourly observation. Constant observation of the other three children, however, was also most valuable, as checking and confirming my records or providing anticipatory hints as to what to look out for.

I should add that the I.Q.'s of these children (based on repeated tests in childhood and up to adolescence) varied from about 120 to about 140: so that the first appearances of some of the activities tend to be somewhat earlier than may be generally expected.

The earliest movements of an infant apart from a few reflexes seem to be spontaneous movements due perhaps to processes taking place in the central nervous system and partly in response to the stimulus of the environment. These movements may be play in Herbert Spencer's sense of the term, but the definition we have adopted involves some conscious tendency to the reproduction of an experience found pleasant, or the carrying out of one which in idea is felt to be interesting or desirable, for example the deliberate and repeated grasping of an object, which I noted at four months. Long before this of course an infant may endeavour to get his thumb into his mouth and suck for the sake of sucking. This however may be regarded as mere sensory enjoyment, or the satisfaction of appetitle, rather than the beginning of a rudimentary form of play. The spontaneous movements, if they do not satisfy our criterion of play, do however fit in with Groos's theory of play to this extent, that they help to develop the muscles for more serious work later.

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[1] See *Das Seelenleben des Kindes*, p. 85. (Berlin, 1913.)

The first time that a kick is repeated merely to experience and enjoy again a sensation like that of the previous kicks, we have genuine play. Thus a large proportion of the activities even of the first months are really a form of play. At what stage the purely spontaneous movements begin to have in them an element due to the impulse to repeat a pleasant experience it seems impossible to say. But one gets the impression of the beginnings of this in such observations as these :

> B. D. 67[1] : As he lies contentedly after a long morning sleep and feed, his hands, feet, mouth and tongue are in constant motion. When alone he has been talking to himself a great deal : less when I was with him. Certainly the talking to himself when alone sounds like self-entertainment.

While we may agree that an activity, if repeated intentionally and merely for its own sake, is being found in some degree pleasurable, we must avoid saying that in play the child performs an act for the sake of the pleasure it will bring him : that would be intellectualising the process too much. To the child the activity and the pleasure are inseparable at this early stage. Karl Bühler, indeed, in discussing the criterion of play as *Funktionslust*, maintains that he who regards the activity and the pleasure as two ingredients, cannot describe the activity as an end in itself, while he who regards the activity and the pleasure as a unity can do so.[2]

There is one type of play which we shall meet which a strict identification of play with completely pleasurable activity would hardly include. Keeping to our main criterion that this activity is engaged in for its own sake, we must include some which seem to be prompted by an urge towards an experience which is not completely and perhaps not predominantly pleasant, as when A at 3 ; 2 asked me again and again to play at "being a lion" and chase him, even when the game had just ended in screams and tears. B did the same at 2 ; 7. Here the craving for a new experience, and perhaps the experiencing of an emotion rarely felt, was adequate motive, but the early stages of the game no doubt at least would be pleasurable.

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[1] D stands for "day," and so throughout.

[2] *Die geistige Entwicklung des Kindes*, Funfte Auflage, p. 458. (Jena, 1929.)

One final general remark may be added. It does not need any *strong* motive for a child to do things. There is an element of truth in a view (quoted by William James) of Professor Lazarus; he denied the existence of an instinct to play, and held that there was only an aversion from remaining unoccupied, and hence a 'sham' occupation had to be devised when no real one was at hand.[1] Many of the activities of play in infancy are very trivial; and the child is quickly directed from them. For most we need attribute no particular motive other than the love of the various activities themselves.

II.—THE FIRST FORMS OF PLAY.

The infant's play will necessarily begin with those functions which develop first: in the first few months we find him especially playing with hand movements and with the production of sounds. Then the playing with parts of his own body, fingers, toes, ears, etc. About the same time begins the long series of handling any and every object that comes within reach, clothing, cups and other household objects, the splashing of bath water and so forth. Mere sensory experience or motor activity seems enough for enjoyment at this stage.

We may be more sure, however, of play in the strict sense of the term we have adopted, when we have either (*a*) obvious delight shown in an activity, or (*b*) a constant repetition of the same action. These are especially likely to accompany or follow the first, or at least the early performance of a new action. Thus at 0; 2⅛ B learned the trick of carrying his dress or eiderdown between his hands, and later with one hand up to his face, and he was fond of repeating this for long periods.

Professor G. V. Dearborn thought that his daughter as early as 0; 2⅛ voluntarily shook her rattle after spasmodic movements had sounded it.[2] Miss Shinn was also convinced that movement "purely for the pleasure of the sensation" took place late in the third month, if not earlier.[3] I made the following note of

> B at 0; 4½: Yesterday he discovered the trick of sucking his lower lip and to-day he has practised it constantly. Often practises singing by starting on a high note and running down a (kind of) scale."

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[1] See his *Die Reize des Spieles*, p. 44, quoted by William James, *Principles of Psychology*, Vol. II, p. 429.

[2] *Moto-Sensory Development*, p. 33. (Baltimore, 1910.)

[3] *Notes on the Development of a Child*, I, p. 188, including footnote.

Also when just beginning to learn to creep :

0 ; 4½ : " Screams of intense delight when put on the floor to creep."

At 0 ; 4½ I noted " Extreme delight in playing with my hair shown by top-note screams." This early appearance of social play (and even earlier examples of mutual laughter at some play)[1] illustrate the influence of the presence of a known and liked parent, instead of a strange infant or adult, with whom social play only appears appreciably later.

A new performance which caused great pleasure was striking the piano keys and producing the sounds. At 0 ; 5 B struck the notes as many as 49 times in three minutes with cries of joy.

At 0 ; 5½ he was so fond of grasping at things that this constantly made dressing him more difficult. Often when nursing at the breast he would stop to grasp at his mother's dress, a chain, a paper she was trying to read, and so on. All our children would often turn from the breast or bottle in order to play. Notes on both A and B at 0 ; 6 show that after the first few mouthfuls, a very slight diversion was enough to stop the infant feeding, a fact which has a bearing on the supposed intense fixation of the libido on the breast during the suckling period.

There was apparent enjoyment in babbling at least by the third month, and also special practising of a newly-acquired sound. Speech development owes much to this delight in practising mere sounds—first spontaneous sounds and later imitated ones. Thus Y at 0 ; 6 is noted as constantly practising for a week or more two new noises : (*a*) a kind of lip trilling, and (*b*) a sound like " tch '. At a later stage the newly discovered use of names was indulged in tirelessly for days and days, then the first use of two words together and so on. Responsive babbling and laughter may be regarded as the first form of social play, occurring at least by the third month, when it was often repeated and much enjoyed.

Apart from this, however, and one or two other doubtful examples (e.g., the play with the hair at 0 ; 4½) there was *social play* at least by 0 ; 5.

" Greatly amused (D. 165) by my repeatedly covering him with eiderdown which he knocked back each time with one motion of his arms. On D. 182 this was done 100 times in quick succession until I tired.

My part in the game possibly gave B a feeling of overcoming me ; though at 0 ; 7 he was seen playing the same game of peep-bo with the eiderdown entirely by himself. Mrs. Fenton observed her boy also in the seventh month playing a ' peek-a-boo ' game by himself with his blanket, and she says he had not been taught this. She attributes it, reasonably I think, to ' the search for visual experiences.'[1]

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[1] I have recorded observations on the early appearance of mutual smiling and laughter in an article entitled " La Psychologie génétique du rire."—*Journal de Psychologie*, XXXIII, 1936.

Rough, romping play seemed to be enjoyed from now onwards. Thus B at 0 ; 6 loved to have a big cushion thrown at him from several feet away—sometimes hard enough to bowl him over. Charlotte Bühler records social play at 0 ; 6 and 0 ; 7—" the infant trying eagerly to include anyone who is present in its play."[2]

By 0 ; 6 B was also extremely fond of banging things—toys, spoons, etc., on his table and apparently enjoyed making the noise. In a series of experiments I did with him at 0 ; 5 in which he was seated at the piano he showed enormous enjoyment in hitting the notes.

III.—PLAY BETWEEN SIX MONTHS AND TWELVE MONTHS.

The following notes illustrate various types of play in the period from 6 months to 1 ; 0. At 0 ; 6 there is still delight in mere bodily movement. Thus :

B at 0; 6, D. 195 : The last two days especially he has been so merry—cooing and shouting most of the time when awake, and not needing toys to amuse him—only to be laid on his back and allowed to kick and roll.

0 ; 6½ : We noticed for the first time a new movement : he took a spoon by the handle and then gyrated his fist so that the spoon described a semicircle in the air. He repeated this five or six times, watching it meanwhile.

0 ; 6½ : Drops his napkin ring deliberately several times on his tray, apparently to make the noise.

0 ; 7 and 0 ; 8 : Constantly banging toys on his table and dropping them on the floor.

0 ; 7½ : Struck notes on the piano one hundred times—with signs of great pleasure. At 0 ; 8½ he banged his aluminium cup so hard on his chair that his eyes blinked each time—apparently a fearsome joy, but kept up a long time.

0 ; 7½ : Repeatedly made loud quacking noises like a duck, different from any heard before, on staircase, apparently to hear the echo. Nurse says he also does it under the railway arch where there is an echo. She says he began it two days ago. At 0 ; 8 I noted : " When not hungry or sleepy he is almost invariably in a state of exhilarant joyfulness and always active." And again at 0 ; 8½ " Even when being dressed his hands are off to play with anything within reach."

As an illustration of typical activity I quote a period of ten minutes play by B (age 0 ; 8) in his playground, with only a small basket, a tray, and a toy donkey. I made this kind of record occasionally to illustrate the apparently commonplace performances which entertain a child at this early age. The fact is that an active healthy infant has an insatiable appetite for sensation and movement and manipulation. Indeed, a great part of Miss Shinn's lengthy volume *Notes on the Development of a Child* is a record of the enjoyment of sensations and playing at movement and manipulation. It is very important to recognise clearly this aspect of child play in the first and second year especially. Otherwise the idea that play is primarily a means of satisfying social or aggressive impulses, or that it is a subtle symbol or expresses a phantasy, may be given far too great importance. Take an example from Miss Shinn's book: her niece at 0 ; 7 and onwards showed an intense desire to pull the cat's fur and dog's tail and ear. It is not, however, necessary to attribute even this to cruelty or the satisfaction of assertiveness; for as Miss Shinn remarks " from the time that grasping was acquired there often seemed a special satisfaction in pulling at a fastened object rather than in obtaining possession of a free one."[1]

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[1] See *A Practical Psychology of Babyhood*, p. 27. (Boston, 1925.)

[2] *From Birth to Maturity*, p. 55.

Record of ten minutes in play-pen at 8 *months.*

" Rolled over with tray in both hands—gnawed it, cooed, tray slipped to left, he rolled over on it: tray seized with right hand (R) and moved about: basket pushed with tray (in R) basket seized with left hand and tray with right; now tray with left: basket rolls to his left so he crawls round, tray in hand; tried to lift up tray from floor with R and L alternately: succeeded with right; then seizes basket so tray drops; tries to lift tray again with R chiefly: pushes it into corner: crawls well over it: eventually gets it up with left: high ' coo ': waves it with left; reaches over to left with right for basket and throws it to right: seizes tray with both hands and turns it over: tries to pick it up with right; takes basket with right and puts it on tray: picks up tray with both hands, especially left. Puts basket on tray and lifts tray, basket rolling off: lifts tray with L; takes donkey in right and bites it: tries to pick design off tray with right forefinger: puts donkey on tray and turns it over with R. Again tries to put donkey on tray, but it is too far: moves tray with right, tries to turn it with left: rolls over with it in both hands: kicks tray repeatedly as he holds it in left: bites tray, rolling on his back: tray falls: tries to raise it with left, but change to right and succeeds: looked round at sudden new sound of typewriter and watches his mother though he cannot see her moving."

Note the persistent play with one object, the tray.

Similar persistence was being shown at this time in practising new sounds; this was noted in all our children during the period about 0 ; 8 to 1 ; 0.

At 0 ; 8½ B had a period of a few days when he particularly enjoyed waving things about wildly, handkerchiefs, bibs, pieces of cloth, etc. This is typical of the way in which a particular kind of play would begin, occupy a lot of time for a few days or weeks or even months and then disappear. Several other observers have noted this. Thus Mrs. Fenton's boy had a " mania for dropping things " about 0 ; 10, while shoes were his consuming interest for a long time after 1 ; 2.[1] Miss Shinn's niece had a special interest for climbing when she was 1 ; 1 and it rose to be her " greatest interest " at 1 ; 4.[2] Mrs. Marjorie Thorburn writes of her own baby :

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[1] Op. cit I, p 190.

> "At ten months she liked to throw down a brick, stoop and pick it up and give it to her mother, her mother to give it back to her, she to throw it down, pick it up and repeat all over and over again. At 11 months another game was equally popular and equally unvarying ; she passed a brick left hand to right, to her mother's left, her mother's right, her right, her left, her right and so on interminably."[3]

Sometimes B would seem to set himself *difficult tasks.* Thus not long after learning to stand up he tried to stand up while holding his big ball in his mouth. There were repeated failures, the ball dropping, but again he would try until successful. Remarkable persistence was shown not only in such new and difficult tasks, but sometimes also in easy and simple games, especially if another person joined in. Thus :

> 0 ; 10 : Threw sugar tongs on the floor. Frl. L. picked them up and so on about fifty times, B laughing constantly.

Here is a form of social play, which also appears in several notes of B at 1 ; 0, which report his giving us things—toys and scraps of paper—and then receiving them back.

IV.—PLAY BETWEEN TWELVE AND EIGHTEEN MONTHS.

About 1 ; 0 appeared for the first time genuine play with an imaginary object. Thus Y at 0 ; 11½ imitated the feeding of her dolls with a spoon. His mother noted of B, at 1 ; 0 :

> " Held out his closed hand to me, saying ' Ta,' as if about to give me something and when I held out my hand, pretended to put something in it, then drew his away and laughed. This was repeated many times and I also did it to him, he holding out his hand for imaginary gifts."

Play with imaginary objects will be referred to again under the period 1 ; 6 to 2 ; 0.

At 1 ; 0 B was fond of turning over leaves of his linen book and gazing especially at the picture of a dog. He would make kissing noises to it.

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[1] Op. cit., pp. 30 and 33.

[2] *Notes on the Development of a Child* (I, 1909), p. 368.

[3] See *Child at Play*, p. 25. (London, 1938).

The psycho-analytic reader must bear this in mind when I relate that at 1 ; 3 he also made kissing noises while looking at a print of the Mona Lisa !

So strong was the impulse to play now that

" even when intensely eager for his food—kicking with impatience—he would after a few spoonfuls insist on being put on the floor to play, his food being brought to him."

Professor Kellog also often found that his child of about 1 ; 0 (and his ape of about 0 ; 10) "could not be induced to eat his meals while the other was playing, so great was the impulse to get down to play also."[1]

At 1 ; 1 B's favourite toys were noted as: a wooden hoop to put over his head, a wooden spoon, to bang things with, cards to put in and take out of a box, a trumpet to blow, and picture books in which the mere turning over of pages seemed an interest in itself.

It was clear in the play of all the children that *new bodily performances* delighted them. Climbing stools or stairs was indulged in, especially by B and C, before they could walk properly. Any new trick was practised repeatedly, including in the case of B, at 1 ; 1½ the steady striking of his head, at 1 ; 2 bending down looking between his legs and grasping a toy behind his heels ; at 1 ; 2 dancing up and down (bending the knees) at sound of barrel organ ; at 1 ; 3 supporting himself on his head and feet as though trying to stand on his head ; 1 ; 4 ' waltzing ' round and round in his play ground (while I played the piano) uttering high shrieks; 1; 5½ dancing up and down sometimes to his own banging on piano, or first playing a few notes and then dancing and so on. Mrs. Fenton also records the repeated practising of difficult ' stunts ' at 1 ; 2, e.g., walking backwards or doing a ' goose-step.'[2] Miss Shinn states that during the period 1 ; 2—1 ; 6 ' a noticeable trait was the child's interest in doing something novel with her body '—e.g., walking with her head thrown back, walking backwards (practised ' all day ' when first discovered).[3]

We have already seen how very early some form of *social play* occurs. It appeared at least by 0 ; 5, not counting earlier responsive making of noises as play. After that there were innumerable little exchanges of playful actions between baby and mother and father. Further varieties now appear. Thus Y at 0 ; 11½ when a doll was given her, held it to each person present in turn, making kissing noises till each had kissed it, thus bringing us all into her play. B at 1 ; 0½ would pull E's hair or the nurse's, and if they did not scream in pretence he would scream for them.

B at 1 ; 2½ : Teased his mother when she wanted to take something from him by holding it out over the couch end saying " ta, ta," and then dragging it away when she tried to get it and laughing until he nearly collapsed.

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[1] See *The Ape and the Child*, by W. N. and L. A. Kellog, p. 119. (New York, 1937.)
[2] Op. cit., p. 34.
[3] Op cit., p. 371.

Kellog's child at 1 ; 1 (and his ape at 0; 11) would often hand an object to a person, receive it back and so on repeatedly[1]. This was a common event with my own children. D. R. Major reports that a desire for companionship in play seemed to be shown by his child by 1 ; 1 or 1 ; 2, and that at 1 ; 2 there was play with a baby of the same age, and by 1 ; 4 he was often " begging " people to play with him at ball[2].

In social play at this period a factor of very great importance is the degree of familiarity with the other individual. Though with the parent or with other infants well known to the child a form of social play may appear at five or six months, it may be quite otherwise with strangers even at ten months or a year. Thus Miss Mary Shirley found that when two infants of 0 ; 10 were put together in a play-pen, they paid little attention to each other. When one toy was provided there was usually a dispute as there was often even when two toys were provided.[3] Also Professor K. Bridges, observing infants of 0 ; 9 and 0 ; 10 found that when they were first put into the pen together they paid little attention to each other, but that by the end of a month there were the beginnings of social play.[4]

Yet Van Alstyne, in a study of 112 children of 2 ; 0 to 5 ; 0 found that only 10 per cent of the two year olds co-operated in play.[5] There are no doubt great individual differences in this matter—as indeed the studies of Mary Shirley and K. Bridges referred to reveal; but the very early age at which social play is recorded with the mother or father makes it probable that familiarity with the other person is a main factor. The contrast between playing with the mother and with a strange child appeared markedly in B at 1 ; 6½. When a new toy arrived at 1 ; 5½—a set of bricks —he would hardly try to build himself, but gave them to E (his mother) one by one for her to build. Yet when almost for the first time he played with a baby of his own age (1 ; 6) he resented her touching his toys at first, though when reproved mildly he gave some to her.

In the growth of this social play, *imitation* seemed to play a considerable part. Imitated actions entered more into the play of my children from about the age of 1 ; 0. At 1 ; 3 B imitated my feeding his donkey. At 1 ; 4 A imitated my bouncing of a ball. Much of Y's play especially was imitative. At 0 ; 11½ Y after seeing a brother turning somersaults, his head on a cushion, twice lay down and laughing put her head on the cushion. W. N. and L. A. Kellog, who brought up their little boy with a young ape as companion, noted the prominence of imitative play in their boy at this same period (about 1 ; 2–1 ; 4) the boy imitating the young ape far more than the latter imitated the boy.[1]

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[1] Op. cit., p. 131.

[2] *First Steps in Mental Growth*, p. 242-244.

[3] *The First Two Years*, Vol. II, p. 74-6.

[4] A Study of Social Development in Early Infancy: *In Child Development*, Vol. IV, 1933, p. 43.

[5] See Stollard and Welman, *Child Psychology*, p. 277. (New York, 1934).

On the other hand many imitative actions such as I have recorded in an earlier paper on Imitation,[2] cannot properly be labelled play. They seemed to be rather the outward expression of a particularly vivid impression. It seems to be genuine play, however, when a child not only imitates with obvious delight, but also repeatedly carries out the action. A demand for imitation may also enter into play. Thus Y at 1; 4 imitated S1 (Sibling) and S2, who were playing at lying down dead. A few days later Y lay on the floor. E imitated her and Y looked up and pointed to me and grunted in a requesting way. I lay down too and then she seemed satisfied. These and many similar occasions with Y and the others illustrate the close connection between the almost automatic imitative impulse (which I have exemplified in the paper mentioned above) and the beginnings of social play proper.

Imitation also led to playing with new kinds of toys. Thus at 1 ; 1½ I was surprised to find how entertained B was in imitating my use of a simple cardboard formboard I made, with one square inset and one circle. Each was put on the hole haphazard, but with much excitement, feet kicking, etc. My impression was that here again, as so often, there was delight in performing a new trick—a satisfaction enough to carry the infant over a period of effort. Certainly at 1 ; 3 B tried for at least ten minutes to fit pegs on the edge of a tub, often with little success, as they kept falling off, on which he would heave a deep sigh. Here again we find interest and persistence in doing a difficult thing. Similarly when B got his foot trapped between the step of his go-cart and the bar, he would not accept help, but eventually got it out himself, and then put it back and practised the awkward task again.

This type of action may be worth observing to see if it would serve as a possible test even at this early age of character and temperament; but many careful follow-up studies would be needed, and in view of the varied and changing phases which some (and perhaps most) children pass through, we cannot at present take any lack of such persistence at this age as necessarily a bad sign. As to this particular child I can add that similar persistence did remain in later development in reference to things about which he cared sufficiently.

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[1] *The Ape and the Child*, p. 141. (New York, 1933).

[2] See " The Psychology of Imitation with special reference to Early Childhood." —*Brit. Journ. of Psychology*, Vol. 21, 1930.

Although new and difficult tasks were specially fascinating, and though the co-operation of a mother or father in play caused special joy, there were continually periods of contented play with simple things. Thus this note is typical:

B at 1 ; 4 : " Plays more with his toys now. Happy and quiet for long periods in his playground—makes his animals stand up now—a new point."

The fact that when novelty is lacking, contented playing with the commonplace was still shown at a year and a half is revealed by this record of another five minutes play.

Five minutes continuous play.

B at 1 ; 7 : Carried glove box into room : put it on couch : climbed up : upset it and put gloves back : climbed down and went to window : got on the footstool and looked out : back to couch and climbed up. Threw glove box to floor : got down, put gloves back and carried box back to hall : brought in basket to E (who now entered room) : fetched glove box to her on couch : grunted till she lifted him up beside her : brushed her dress with brush : put basket and box on her lap (still sitting by her) got off couch : tried to take things out of E's work basket : sat on stool and played with three cards of wool. Thunder occurred at this point. B got up and looked out of window and tried to open window : climbed chair by window and tried to open window : tried to open work basket again : laughed when E smacked his hand : sat on stool and kicked his heels : put wool cards back into basket and said " go " (=gone) : sat down : got up and got cards out again.

Repetition in play. " Children," wrote Freud, " repeat in play everything which has made a great impression on them."[1] No doubt, but certainly also at this stage at least, they may repeat over and over again many things which can hardly have made a profound impression. As we have seen, from the earliest months almost every new experience or accomplishment—whether it be smacking the lips, the sensation of banging the heels, making new speech sounds, grasping the other hand or the toes and then other objects, banging one thing on another to get the sound, putting things in boxes and taking them out, dropping a mug from a tall chair as often as an indulgent parent will pick it up, all these and scores of other things are practised, sometimes a hundred times in immediate succession. Even Kellog's ape, when at 0 ; 8 she " discovered the joys of dropping things" from her high chair, became "addicted to the habit."[2]

Thus it seems quite gratuitous to drag in subtle unconscious motives into the play of infants at this stage, as is done by Freud in his *Beyond the Pleasure Principle.* There he tells (p. 12) of a boy of 1 ; 6 who used to throw his toys into the corner of the room or under the bed, with an "expression of gratification," though the mother interpreted the drawn-out cry "*o-o-oh*" as *fort* (go away). "One day," writes Freud, "I made an observation that confirmed my view. The child had a wooden reel with a piece of string wound round it. It never occurred to him, for example, to drag this after him on the floor and so play horse and cart with it, but he kept throwing it with considerable skill, held by the string, over the side of his little draped cot, so that the reel disappeared into it, then said his significant 'o-o-o-o' and drew the reel by the string out of the cot again, greeting its reappearance with a joyful '*Da*' (there)."

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[1] *Beyond the Pleasure Principle*, p. 15.

[2] Op. cit., p. 119.

"The meaning of the game was then not far to seek. It was connected with the child's remarkable cultural achievement—the foregoing of the satisfaction of an instinct—as the result of which he could let his mother go away without making any fuss. He made it right with himself, so to speak, by dramatising the same disappearance and return with the objects he had at hand."[1]

To one who has watched daily the play of a number of infants from the earliest months, this explanation will, I think, appear fantastic. Nor indeed is it such a "remarkable cultural achievement" for a child of 1 ; 6 to learn not to cry when a mother leaves it for a time. An active-minded child (as this infant observed by Freud seems to have been) must even at this early age often be about his business of learning and experimenting and does not want invariably to be on his mother's knee.

. . . .

Make believe play began as we have seen in this period from 1 ; 0 to 1 ; 6, but as it develops more interestingly towards 2 ; 0 it will be left for the second part of this paper.

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[1] Op. cit., p. 13.

Part II of this article will appear in the next issue.

OUTLINES OF RESEARCHES REPORTED IN THESES ACCEPTED FOR HIGHER DEGREES.

A Study of Juvenile Delinquency in Birmingham and the Midlands.

By CHRISTINA HYDE.

This thesis was approved for the Degree of M.A. in Education at Birmingham University in 1933. *A copy of the thesis is deposited in the University Library.*

In 1930, 39,000 sentences were imposed in courts: of these, 28,000 in connection with persons previously found guilty; 20,000 had been imprisoned; and 3,382 had served from 6–10 previous sentences; 2,622 served from 11–20 sentences; and 2,125 more than twenty sentences.

Statistics of every year show that of more serious cases tried at Assizes and Quarter Sessions, 70 per cent have been previously convicted at least once. In 1927, of 36,000 men committed to prison, 24,000 had been there before; of 7,000 women, 6,000 previously imprisoned.

These figures indicate a failure of the prison system.

CHILDREN'S COURT, BIRMINGHAM.

In 1932, 1,181 children under 16 were charged: 1,130 boys, 51 girls; a further 69 (59 boys, 10 girls) charged with adults in ordinary courts. Total number of cases for 1929, 1930, 1931 were 927, 1,122 and 1,119 respectively.

Number of children sent to industrial schools was 41 in 1932, compared with 34, 27, 41 in three preceding years, and 23 young persons sent to reformatory schools as compared with 20, 32 and 15 in same three years.

Number of children placed on probation in 1932 was 376, as compared with 355 in previous year and 320 were brought forward from previous years. Of 696 dealt with, 36 were reported unsatisfactory and dealt with as follows: 4 placed on further probation, 2 committed at Quarter Sessions to Borstal, 28 committed to approved schools; 2 cases were adjourned *sine die*. Percentage of children appearing before court on a second occasion during 1929–1932 was 11·7 per cent.

PROBATION SYSTEM.

Especially well developed in Birmingham. Under Probation Act no provision for inspection of officers, on whose personal efficiency success of system depends. Birmingham solves this difficulty by Probation Committee, which meets monthly and inspects records of every case; has reports of all unsatisfactory cases and advises officer-in-charge on such cases. Officers in turn attend these monthly meetings.

Sections of remand homes and girls' hostel in Birmingham set aside for probation homes. Routine aims at approximation to family life.

HOME OFFICE SCHOOLS IN MIDLANDS.

SHAWBURY SCHOOL, SHUSTOKE.

A country school: Grade A farm. Neighbouring farmers anxious to employ boys: at busy seasons boys actually at school go to help local farmers. House system successfully developed. Usually 100 boys in residence.

ANSELL SCHOOL, HARBORNE.

Licensed for 150 boys. After-care system well developed. Reports state that 90 per cent boys discharged make satisfactory progress.

NEWFIELDS, COVENTRY: GIRLS' SCHOOL.

Children go out to local elementary schools—a useful and successful practice.

Total entries, 1928–32	49
Discharges, 1926–30	36

Satisfactory during three years under after-care supervision. Of six unsatisfactory two were borderline mental cases.

Disposal, 1928-32: to domestic service, 28; to office work, 3; to factory work, 3; transferred for higher education at Elm House, Palmer's Green, 6.

NORTON TRAINING SCHOOL, BORDESLEY GREEN.

For senior boys. Curriculum based on three-year course. Successful tailors' and cutters' department. Head master receives regular friendly letters from old boys, some of whom have joined the police force.

KNOWLE HILL, KENILWORTH.

For senior girls. Trains majority for domestic service. Young person due next to go out into service has room to herself to accustom her to conditions of future life. Parents visit school four times yearly. Each girl allowed a week's holiday at home or to friends. £9 spent on outfit of girl leaving school.

During nine years ending December, 1932, eighty girls discharged. Of these, five later came into hands of police.

YOUNG PERSONS IN H.M. PRISONS.

Limited accommodation of small prison prevents adequate segregation of young persons. At H.M. Prison, Birmingham, all 45–60 women usually imprisoned are required to work together (e.g., in laundry) to cope with needs of establishment. Only one " hospital " and one " pregnant ward," so that young girls and recidivists are not separated. Some lay magistrates still cherish a belief in the efficacy of the " short sharp sentence."

OTHER OBJECTIONS TO PRISON FOR YOUNG PERSONS.

(*a*) Physically harmful to adolescents. Narrow galleries, small cells, cramped exercise yard.

(*b*) Strict routine and discipline afford no scope for training of plastic mind and character.

(*c*) Sentences of young persons usually short, so that no effort can be made at character building. Borstal experience suggests that two years is minimum time needed for such training.

(*d*) No opportunity for after-care. Discharged Prisoners' Aid Society hopelessly cramped from lack of funds and is casually organised by well-meaning voluntary workers. Is unable to find work for really " difficult " person. Often help consists merely in giving a packet of grocery.

(*e*) Imprisonment is not usually accompanied by psychological study of causes of the crime.

CAUSES OF JUVENILE DELINQUENCY.

(1) Physical factor: defects means potential delinquency.

(2) Mental deficiency (15 per cent of boys examined at Boys' Prison, Wandsworth, are sub-normal).

(3) Social conditions—e.g., vice in home, poverty, defective family relations, defective discipline, etc.

(4) Want of rational amusement. Birmingham organises evening play centres—a good provision.

(5) Unemployment. (Not a problem in Birmingham.)

(6) Some delinquency (hooliganism and petty theft) due to misguided expression of instincts.

(7) Pathological causes. Investigation at H.M. Prison, Birmingham (Women's Section), and at Holloway Prison, showed that 93 per cent of prisoners were in some form psychopathic, either by psychological arrest in development or through maladjustment or mental conflict or through incipient neuroses.

PLEA FOR ABOLITION OF LAY MAGISTRATES.

(1) Lay magistrates are often out of touch with social conditions of prisoners.

(2) They rarely have proper qualifications for the work—legal, medical, psychological.

(3) They have no means of knowing what will be the effect of their verdicts.

Fluctuations of Attention at or near the Threshold.

Thesis presented for the M.A. Degree in Psychology, London (University College, 1938).

BY ZOK TSUNG CHEN.

AN investigation of fluctuations of attention at varying stimulus levels at or near the differential threshold for sound, vision, and weight-lifting.

For any one experiment just two weights or two intensities of noise or light were used. They were presented singly in a pre-arranged order, with two seconds between each. The subjects were told to indicate whether each stimulus as it came was greater than, less than, or the same as the one next preceding. Sixty university students were tested.

The results were dealt with in three ways. To begin with, conventional " mean periods " were calculated. (In a continuous record of work, whether at the absolute or the differential threshold, the subject manifests fluctuation in that he switches from sequences of correct to sequences of incorrect answers. In an experiment lasting continuously for " X " seconds the total time covered by correct sequences divided by their number gives the mean positive period, the mean negative period being similarly obtained by averaging the length of sequences of incorrect answers. The mean total period is the sum of the other two.) It was found that " mean periods " of the kind varied with the stimulus. Thus, for example, the mean total period was minimal at the limen. These findings are in conformity with those of Wiersma, Guilford, and others.

The records were next plotted as " output curves " against the log of time. As so expressed they tended to conform to the geometric wave system postulated in the work of Philpott, whether the stimulus was liminal or not. Finally, as a third step, the method of serial correlation was applied to the curves just mentioned in order to verify the statement that they conform to the geometric system.

On the whole, therefore, the findings are that although calculated " mean periods " may vary with the stimulus, the true underlying periods do not. They remain constant within the geometric system whatever the stimulus level.

BOOK REVIEWS.

A Humane Psychology of Education: By JAIME CASTIELLO. (Sheed and Ward, pp. 254, 7s. 6d.)

The writer belongs to the Jesuit Order and is Professor of Educational Psychology in the Fordham University Graduate School, U.S.A.; and by "humane" he means "written from the standpoint of a humanist" in the Renaissance sense of the term. It is not, as the title might suggest, a text-book of psychology for teachers embodying the matter ordinarily included in such works, but is a critical discussion of what we might call the philosophy of psychology, written from the Roman Catholic standpoint, and examining the underlying assumptions of the type of educational psychology which is prevalent in the United States. The writer is a Spaniard by descent, a Mexican by birth, a pupil of an English school, a student in Germany and a professor in America; he has published books in French and German; but, though he frequently turns this wide experience to account, the thought as well as the style of this volume is thoroughly English, apart of course from its Thomist position.

Perhaps to British readers the most interesting thing to know about the book is what the reactions of American psychologists and educationists to this kind of criticism are likely to be. Will it be simply ignored as "clerical" or will the psychological standpoint be considered worthy of discussion? It is a root and branch attack on all that is commonly taken in this country to be characteristically American in psychology, in educational theory, and to a great extent in educational practice; for it recognises that psychology, theory and practice form a consistent system. The American intelligence testers are, indeed, allowed a minor place in the true edifice of knowledge, but Thorndike and Dewey are pursued from Dan even to Beersheba. English writers, on the other hand, especially MacDougall and Spearman, are frequently used to outflank the "stimulus-reaction" position, and it may fairly be said that, so far as Professor Castiello's psychology and educational theory can be separated from his specific theology, they would be largely acceptable to the majority of British readers.

The book falls into four main sections, the first three being concerned with the intellectual, æsthetic, and moral sides of human nature (the author, anxious to avoid all which emphasises what is common to man and other animals, avoids the words "cognitive," etc.), and the fourth with the educational organa suitable to them. Its main positions under the first three heads are as follows: (1) It is the power of seeing relations, as expounded by Spearman, which makes education as distinct from training possible; by ignoring it, American psychology abolishes education and leaves training. (Note that Spearman's relations become to the realist author Platonic ideas.) (2) Art is entirely non-utilitarian and cannot be brought under any system of biological values. It cannot, therefore, have any legitimate place in a psychology which is built up on such values. (3) Man synthesises from the beginning; his conscious purpose should be directed to making him as completely synthesised as possible at the end; and education, as opposed to training, is concerned with the same end. Hence what results from a "chaotic" psychology (i.e., what Spearman calls "anarchic") cannot properly be described as an education. In the fourth section the moral is pointed against the "elective" system and a demand is made for an all-round and balanced curriculum.

The case against the atomist idea of the human mind is convincingly worked out; but that idea has never commanded much support in this country; consequently it is the last section which will arouse most interest here. We in Great Britain have accepted the all-round, balanced curriculum in theory, but have thought it sufficient to apply it only up to the age of sixteen. Professor Castiello, however, tells us that no pupil can study science scientifically or history historically till after that age and that the only time when a synthesis can be made is at the end. At the one point when the bricks of education could be built into an education, we cease to educate and instead we specialise. And it is difficult to resist his conclusion! If so, our university system is all wrong. And may it not be that it is so? Something is undoubtedly wrong with Europe and America to-day, and surely it must be something more fundamental than certain gaps in our knowledge of economics : the violence of the symptoms suggests that the " education " of the last fifty years has not produced amongst the " educated " a generation with either a right sense of values or a capacity to see the world steadily and see it whole.

The suggestiveness of the book will not be seriously diminished to non-Roman readers by its maintenance of certain positions which are obligatory on Roman Catholics, if these readers know how to distinguish them : (1) Evolution, as it is generally understood by biologists, is rejected. The impassable gulf between intelligence and reason, i.e., between human and animal mentality, is a corollary. Professor Castiello speaks of there being " an unbridgeable chasm between thought and matter and between instinct and thought." The reader who sees these two distinctions treated on an equal footing may minimise the former and so lose the whole sequence of the book. For the first of these " chasms " is the fatal objection to behaviourism ; the ignoring of it makes psychology a branch of physiology, and the physiologists cannot do what we need. " What is mind ? No matter. What is matter ? Never mind " expresses an absolute bisection of the known universe. But no such bisection is predicated by the second distinction : there is nothing animal which is not also human, though there is much human which is not also animal ; and in man at every moment the animal and the human are combined ; (2) Another position which is obligatory on a Roman Catholic is the acceptance of free-will and the rejection of determinism. The author claims to be basing this view on universal experience : " On getting back to real life (determinists') actions give the lie to their theories." But, while we all act on the theory of free-will as regards our own actions, it is equally true that we all to some extent act on a deterministic hypothesis as regards the actions of others. Life in fact presents us with an antinomy. In these days when science is showing that the human mind is incapable of understanding ultimates and that the use of reasoning beyond the limits of experience may result in such antinomies, may we not hold that this antimony is due to the limitation of our own minds, and act on both assumptions in their respective spheres ? Then neither morals nor education will suffer ; for determinism is as inspiring to the educator as it is deadening if conceived as applying to our own action ; (3) The necessity of working within the limits of scholasticism does not greatly affect the main theme of the book, though we occasionally suspect an attempt to identify Aristotelian with modern views to a greater degree than is warranted ; (4) The need for the truly educated man to synthesise the various kinds of knowledge is worked up into the need of a control by the Church over the imparting of all knowledge because every part will ultimately be a component in the synthesised whole. This, of course, no one who is not a Roman Catholic would accept. We feel it necessary to point out these tendencies because they are likely to strike some readers so forcibly as to antagonise them to the book as a whole, and it is a book which students who are familiar only with behaviourist literature might do well to read. R.L.A.

Measuring Intelligence : By LEWIS M. TERMAN and MAUD A. MERRILL. (George Harrap and Co., Ltd., pp. 461. 10s. 6d.)

Professor Terman, in association with his colleagues at Stanford University, here presents a revision of the earlier Stanford-Binet Tests of Intelligence, after a prolonged series of experiments and testings. The new scales are two in number, and approximately equal in difficulty, thus providing a possibility of re-testing after a short period, without any serious improvement due to practice. One of the things indeed actually tested was the improvement in the estimated I.Q. when the second test was applied a day or two after the first. There was found on the average to be an increase in the score of about 2½ per cent whichever scale was used first.

The new tests are considerably wider in their range than the old. Each scale contains 129 tests, and the age range is now from 2 up to 14, followed by further sets for "average adults," and "superior adult I" and "superior adults II and III." In addition, there are now tests for the half-year periods of 2½, 3½, 4½. The central core of the test scale remains still the Binet and the Stanford-Binet tests, but there are, in addition, a considerable number of new tests.

The procedure was as follows: First, there was "a study of every kind of intelligence test item that had been used or suggested." A number of these were then selected for experimental trial, especially those which experience had "shown to yield high correlations with acceptable criteria of intelligence" (page 7). For the preliminary testing, about a thousand subjects were used for whom mental ages had already been determined by the original Stanford-Binet scale. Finally, the provisional scales were applied to over three thousand subjects on whom the standardisation was finally based. Care was taken to include fair proportions of children of professional men, of business and clerical, skilled labour, semi-skilled and unskilled groups. The authors think that the distribution may be "biased slightly in the direction of superiority of occupational status." Attention was also paid to the elimination of tests which seemed to favour one sex more than the other. The authors found that the mental age score showed little tendency to improve after the age of 15. Trade conditions were so bad at the time at which the testing was done that the authors believe that they largely escaped the usual effect of the selection of superior individuals for testing at the higher stages. Characteristics of this new scale are the detailed instructions for the giving of the test and the very elaborate instructions for marking. These, in fact, tend to become somewhat wearisome and it seems doubtful whether so much detailed instruction is worth while in view of the fact that there may be differences of opinion as to whether some of the answers are legitimate or not.

The final result is probably the most elaborate and carefully planned set of intelligence tests based upon the Binet series; but, of course, as the authors themselves point out, the main bases of the tests are the percentage performance at various chronological ages and the correlation with the earlier Stanford-Binet tests. Those who hold, therefore, that the essential purpose of such tests should be to give weight only to certain general factors of ability will retain their objection to this type of test. If, however, one abandons the too great an insistence upon the testing merely of a *general* element and recognises that specific abilities are important and inevitably present, the convenience of this type of test, giving a mental age and intelligence quotient so conveniently and readily, is undoubted. A serious weakness in the whole scheme, however, is the elaborate [illegible] ts high cost. Incidentally, the warnings printed on the test [illegible] copying by exact reproduction or in a modified form, because of copyright, reads strangely in view of the fact that, of course, the great majority of the tests in the book are based upon intelligence tests used and devised by other workers, as, indeed, is inevitable in the development of intelligence testing. It is somewhat strange, by the way, that there is no reference to the extended standardisation for English children of the Binet Tests made by Professor Burt. For English children the terminology of some of the tests in this book will also make them less certain as tests for the given age than earlier forms standardised on English children. These, however, are relatively minor points, and the book remains as a record of a remarkably extensive piece of research work and a notable contribution to intelligence testing.

Inhibitions, Symptoms, and Anxiety: By SIGMUND FREUD. (Hogarth Press, London; pp. 179. 6s.)

This is a translation of a book published in 1926, the American translation made in 1927 never having been issued in England and now being out of print. The volume is important as giving in detail some of Freud's more recent and considerably revised views on important topics within his system. The book is chiefly concerned with the problem of anxiety, which Freud of course traces back to infancy. It is notable, however, that he entirely rejects Rank's thesis that the origins of anxiety are to be found in the experiences of the child during birth. Freud's criticism here (pp. 102-5) of Rank's assertion seems to be unanswerable. To the reviewer, however, Freud's own attempt to trace the beginnings of anxiety to such experiences as the fear of castration are no more convincing. Freud criticises Rank's view on the ground that there is little or no evidence that those children who have had prolonged and difficult birth have suffered more from phobia and other neuroses in childhood, although that is a matter which could be tested. The same criticism could be surely applied to Freud's own interpretation of the fear of horses, for instance, as being due to a conflict dependent on the Oedipus complex, or the fear of castration. Here the single famous case of Hans and the case of the " wolf-man " are repeatedly stressed where for reliable evidence one needs numerous instances and also control cases. Further, Freud admits, of course, that women cannot have castration anxiety. We are bound to admit, he writes (p. 81) if we think of the neuroses of women that there are other motive forces of repression than the fear of castration. If then, this is unnecessary to explain any of the neuroses of women why should it be necessary for men ?

The extreme length to which such theories may be pressed is perhaps best illustrated by Freud's suggestion (p. 127) that, " for instance, a man may retain his fear of castration in the guise of a syphilidophobia, after he has got to know that it is no longer customary to castrate people for indulging their sexual lusts." But surely syphilis is bad enough to fear without any such interpretation. It is strange indeed that Freud seems to return to the idea that fears must be traced back to the earliest occurrences of childhood ; because he himself states most admirably the principle which I should associate with the principle of maturation, which would quite adequately account for the appearance at later stages of development of various specific fears which may have been of biological value. Thus he refers to serious anxieties being characteristic of different stages in early development. One has only to carry this principle further to realise that various entirely new fears may arise when the child is sufficiently mature.

There are one or two very important statements in this book which give a basis for a wider interpretation of many of the phenomena with which Freud is concerned than is usually allowed for by most of his followers. Very important, as it appears to me, is the statement (p. 127) that the neuroses of childhood are " in the nature of regular episodes in a child's development, although too little attention is still being paid to them. Signs of childhood neuroses can be detected in all adult neuroses without exception ; but by no means all children who show these signs become neurotic in later life." In some of the psychological treatment of children at the present day, one sees at times the suggestion that anything other than the prefectly rational normal calm behaviour of the child is a sign of a later neurosis and must have special treatment.

A further statement is that made by Freud when dealing with Rank's view about the importance of the birth trauma. It leaves, he says, " no room for the legitimate claims of hereditary constitution as an aetiological factor." This has been, of course, recognised by Freud elsewhere as one factor ; but again it is almost ignored by some of his disciples who concern themselves with child development.

Twins, a Study of Heredity and Environment : By H. H. NEWMAN, F. N. FREEMAN, and K. J. HOLZINGER. (University of Chicago Press. Agents in Great Britain and Ireland, the Cambridge University Press, pp. 369. 18s.)

This substantial volume is the record of an enquiry of unusual interest. It is the result of the co-operation of a biologist, a psychologist and a statistician, and is based upon research extended over ten years. It includes the record of nineteen case studies of pairs of identical twins who were separated in infancy and reared apart. Very few of such cases were on record before. In addition, there are detailed comparisons of fifty pairs of identical, and fifty pairs of fraternal twins brought up in similar environments. The infants were studied from almost every point of view: as to physical traits—height, weight, and a dozen other physical characteristics ; by intelligence tests of various types, and by the June-Downey Will-Temperament tests. There were also records gathered from home and school as to general disposition and special interests. The results of all these enquiries are set out in tables and graphs, and by correlation coefficients, together with a large number of detailed case studies. Thus the book affords a large amount of material for the psychology of many individual topics, in addition to the study of the relative influence of heredity and environment. On this problem the authors speak with caution, and it is evident that this is increased by attempts to get some unanimity between the three. The conclusions are thus so guarded and usually so elaborate and with so many provisos, that it is difficult in a short space to give the main conclusions reached. Yet a few striking sentences in their general summary and interpretation stand out. One is that the identical twins become neither more nor less alike as they grow older, either in physical or mental traits ; whereas on the other hand fraternal twins, while remaining much alike in physical traits, grow less alike in mental traits. Another general conclusion, no doubt not very original, though with more backing than is usually found, is to the effect that " physical characteristics are least affected by the environment, that intelligence is affected more ; educational achievement still more ; and personality or temperament, if our tests can be relied upon, the most." The last proviso is perhaps very necessary, as most English psychologists would demur at the June-Downey tests, for example, being taken as means of making very dependable estimates. It is perhaps in reference to rather detailed matters that this careful study will be of most value. As the authors say, " it may be that the coarser outlines of behaviour, including perhaps those which are most susceptible to quantitative measurement, are relatively more determined by genetic constitution ; whereas the finer details, which may be observed but are difficult to measure, are more subject to modification by the environment, or even by chance." It may, I think, be suggested that slight initial differences may, by producing a difference of attitude and behaviour, themselves modify the environment of the individual ; so that in this way the child makes even its own environment to a greater extent than may appear at first.

C.W.V.

Infant Speech : By M. M. LEWIS. (Kegan Paul, pp. 335. 12s. 6d.)

Mr. Lewis traces the development of a child's speech from his first inarticulate cries, through the stage of baby talk, till he can speak reasonably adult language. The chief interest of the book is threefold. Mr. Lewis is a phonetician, and his analysis of the child's early cries is illuminating. Roughly they fall into three groups : the nasalised cries that arise from discomfort and ask for help, the syllables with front consonates that are associated with contented sucking movements, and the gurgles of repletion. These sounds become, under the influence of adult speech, gradually conventionalised, but their primitive character still affects certain words ; so that *ma*, the cry for help, becomes the word universally associated with mother, and *pa* or *ba*, the sound of contented, if hopeful babbling, with father.

In addition to these phonetic sounds a child's speech is affected by the intonational pattern of those with whom he comes in contact. The child by nature responds to the human voice, and the response is almost from the beginning emotional, corresponding to the emotion of the intonation. Just as an emotion can be conveyed to the very small child by the expression of the face it sees, so it can also be conveyed by the intonation of the voice.

Farther, Mr. Lewis points out that for an intelligent understanding of the growth of language the child's speech must be taken in its context, and the gradual differentiation of the sounds noted. For a baby speech has two functions, one to make others share his interests and emotions, and the other to make them give him what he wants. Thus the early cry of *e e* may mean, " Look, there's a horse. How exciting " ; or it may mean, " Give me my dolly." The child finds that the adult responds more satisfactorily if exact words are used. He therefore struggles to acquire adult speech, and after various incorrect attempts, which are interestingly discussed, achieves his aim.

This is a valuable and careful book on a specialised topic. M.S.

Growing Minds : *An Introduction to Educational Psychology* : By H. BOMPAS SMITH. (University of London Press, pp. 221. 5s.)

This is a noteworthy book. Long years of reflection and experience have bestowed upon it the maturity of wise judgment and discerning selection. Its subject matter is not strikingly different from that of other books written for the same purpose, but Professor Bompas Smith can impress upon familiar facts a new emphasis, and can bring to his support an unexpected quotation.

Thus, from *Tom Brown's School Days*, he quotes East's confession: "They think I'm a devil-may-care reckless young scamp. So I am eleven hours out of the twelve, but not the twelfth." This unique twelfth hour is suddenly lifted by Professor Bompas Smith into significance: it links the boy with the ideal and its flowering in youth. A quotation from Bridges completes the thought:

> "What a man looketh for in his friend and findeth, and loving self best, loveth better than himself, is his own better self, his live lovable idea, flowering by expansion in the loves of his life."

The book is rich in quotations both from scientific writers about children and from a wider source, revealing the humanity of the writer, and giving the book a freshness and charm that are absent from many text-books.

Yet it remains an admirable introduction for young students of educational psychology. It is divided into two parts: the Growth of the Boy's World, which outlines the main direction of growth from infancy to adolescence; and the Growth of the Boy's Mind, wherein the main aspects of mental growth are analysed and illustrated. Nowhere does the reader lose a sense of the living child, the whole to which the analysed activity belongs; nowhere does he forget that analysis is only the servant of clear thought, and that the teacher's task is mainly one of synthesis.

Recent as well as more remote investigation is used in the elucidation of the teacher's problems; if the author's fondness for Bridges, Whitehead, Wordsworth and many other writers is obvious, it is equally clear that he is familiar with Thorndike, Burt, McDougall, and the host of modern psychologists. He uses his sources with skill and his style is marked by a most commendable clarity. It is tempting to quote more examples, but quotations would multiply unduly and this note will serve its purpose better by commending the book to teachers and especially to young teachers. F.S.

Things I Cannot Forget: By P. B. BALLARD, M.A., D.Lit. (University of London Press, pp. 286. 8s. 6d.)

Those who know how entertaining Dr. Ballard can be when he writes even on such subjects as Mental Tests and Formal Training will expect a feast of good things in a book devoted chiefly to the lighter side of his experiences as a schoolmaster and inspector; and they will not be disappointed. I would not however give the impression that this is a collection merely of humorous stories and descriptions of interesting characters met in the course of the author's life. There is much which is also of interest from the point of view of the history of education, because there are intimate incidents from his own experiences in boyhood and at school and in the old Borough Road Training College, and also as a pupil teacher. Ballard, like many others of his generation, had to fight his own way and give himself to strenuous work such as not many of our present generation of young men have to undertake. Scattered among these lively pages are many ideas on the principles and practice of education that are well worth pondering by the student. Nor could a careful reader fail to learn much of the nature of boys and of teachers. Incidentally there are reports or comments about a remarkably large number of well-known people in the half century and more covered by Dr. Ballard's book. In short, the book is both profitable and entertaining, both in its matter and manner, and what more could one say? C.W.V.

The Sub-Normal Mind: By CYRIL BURT. Second Edition. (Oxford University Press, pp. 372. 10s. 6d.)

We are not surprised that a second edition of this comprehensive and most interesting book has been called for within two years. For this edition Professor Burt has made a careful revision throughout and added a list of stimulus words for free association tests in an appendix. It is thus an even more valuable introduction to all aspects of subnormality.

The Charity School Movement: By M. G. JONES. (Camb. University Press, pp. xiii+446. 21s. net.)

Miss Jones has written a book which must at once step into the ranks of classic works in the history of education. It is an examination of charitable educational activities in the British Isles during the eighteenth century. The study has needed attention for a long time, and here at last is a detailed report upon the efforts to provide some means of instruction for the children of the poor. The stories for the different countries concerned have their peculiar settings, amid which politics, religion, industry, social conditions, and even geography, play their parts for good or bad. There was no lack of philanthropy, but misguided direction was given by some of those who were most anxious to do good ; instances of maladministration have been found turning well-meaning deeds into curses. Dickens' picture of Dotheboys Hall, not so imaginary as many suppose, shows a state of affairs that must have been mild when compared with what Fitzpatrick found in Irish Charter schools !

The S.P.C.K. changed its policy regarding the establishment of schools in England ; and we are given the reasons, including the diversion of attention from the child to the adult as the important object of reform. Jacobitism in the first half of the century and Jacobinism in the second were terrible bogies, and fear of each had its effects on the methods and progress of administration. The importance of Sunday Schools has long been admitted, their influence towards the social betterment of the people has been duly brought out, it is shown how they were the means of keeping the idea of free education before the public eye and of discounting the effects of wars and the industrial revolution.

The author sets the background to her story with skill and apparently sound historical imagination, showing the aims and motives of various forms of propaganda quite clearly. To many, the religious and political aims that motivated the provision of some form of education in Scotland and Ireland will cause no surprise, but Miss Jones records much that has been unnoticed by other writers, perhaps because others had no concern with such details, whilst this is a specialised study ; but at all events she notes the progressions and the halts that have occurred as the century went by ; the opposition of the people on one side, misunderstandings of racial aspirations on the other. Take, for example, that English was taught so that the Scriptures might be read in English, as if the messages of the Scriptures could not be as well conveyed in the native tongue of the Gael or the Celt. To those of us who look on the picture of the times after more than a century has elapsed, it is amusing to note the self-complacency of those worthies who sought to introduce " civilitie " to those they considered incivil principally because views differed.

But although there were bad patches, the efforts bore fruit that was " excellent in parts " and apart from temporary advantages to individuals, they really did prepare the way for developments from which we profit to-day.

We can but pick out a few points from many that emerge in a study of this book, which is encyclopædic in its detail, scholarly in its treatment, well documented and without doubt an important contribution to studies in the history of education.

A.P.B.

The Year Book of Education, 1938. (Evans Bros., Ltd., pp. 1017. 35s.)

We welcome again this annual addition to the series of Year Books begun in 1932. As is now usual, there are brief notes on current educational problems, which include reviews of one or two important books and reports, followed by various statistics of education in this and other countries, and a survey of educational finance in Great Britain.

Then comes the most substantial part of the book, that is two large sections dealing with examinations. The first, covering about 100 pages, deals with the problem of examinations in the British Commonwealth of Nations and the United States of America. The next larger section, prepared under the direction of Sir Philip Hartog, is supposed to deal specifically with the *purposes* of examinations in Great Britain. Sir Philip himself contributes a very concise and apposite introduction to this very important topic, on which there is so much loose and vague thinking. Dr. Ballard's section on " The Free Place Examination " is also a most valuable and comprehensive survey.

The other chapters deal with such topics as the examinations for the Bar, " Greats " at Oxford, the Cambridge Classical Tripos, various degrees at London and Edinburgh, etc. Some parts of these chapters, however, tend to become rather descriptions of the course and the methods of examining, etc. At times the implications of a somewhat antiquated psychology may result in the authors unwittingly supplying Sir Philip with targets for subsequent " sharp shooting."

A very topical and welcome section follows, on Adult Education in this country and the U.S.A. Further on, brief notes are given on School Broadcasting and Physical Recreation. There is also a substantial section dealing with education in India.

As regards the general production of the volume, it will be noticed that the size has again increased beyond 1,000 pages, although efforts were previously made to reduce this.

One important improvement which has been suggested in this JOURNAL in previous reviews is the varied page headings which have now been given. These greatly assist reference.

We would suggest as a further improvement that the main sections of the chapters should have bolder type. At present the main sections have a less prominent type than their own sub-sections. We hope the Editors will consider the possibility of issuing a comprehensive index after, say, ten volumes of the Year Book, covering the whole of the series ; this would help to bind it together into a most valuable encyclopædia of education.

A History of Psychology in Autobiography. Volume III : Edited by Carl Murchison. (Clark University Press, pp. 327. 22s. 6d.)

The third volume of this series (which we regret to find from the preface is to be the concluding volume) includes several chapters of special interest to British students of psychology. One is glad to know more about the early life and ideas of such well-known men of the present day as E. L. Thorndike and J. B. Watson. One is surprised to find that Thorndike was not stimulated by the writings of James, Ward or Stout. Thorndike states that he needed for stimulus ideas backed up by facts and supported by a lively style.

Those who, like the present writer, were students of C. S. Myers, will be even more gratified to have such an excellent record of his career from his own pen, and the wise observations of his mature experience. The founder of the present Cambridge Psychological Laboratory would be expected to attach importance to a training in exact method, and of great interest at the present time is the conclusion that Dr. Myers gives on page 220 : "I believe that the several ' schools ' into which psychology is now so unfortunately divided, and to none of which I have ever been able to give undivided allegiance, owe their existence largely to lack of training in these methods and to the undisciplined conduct of research, the rash generalisations, the prejudice, and the influence of suggestion thus engendered."

Another most welcome autobiography is that of Professor S. C. Bartlett. Bartlett hurries modestly over his own earlier career, but provides an extraordinarily acute and comprehensive discussion of his general view of psychology, and his few pages will be well worth reading even by the advanced student for a masterly summary of what he calls " the Cambridge approach to psychology."

Space does not permit of comment upon all the autobiographies here, but one can say in general that it is valuable in enlisting one's sympathy and admiration for some men whose main ideas in psychology may not particularly attract one.

A Conspectus of Examinations in Great Britain and Northern Ireland : BY SIR PHILIP HARTOG and GLADYS ROBERTS. (Macmillan and Co., pp. xiv+182. 3s. 6d.)

The compilers of this volume, which serves as a preliminary guide to those seeking information, have made a broad survey of the numerous examining bodies in Great Britain and Northern Ireland. Individual calendars must be consulted for details which obviously could not be incorporated in a handbook of this size. Its wide scope comprises L.E.A. examinations for secondary school entry, "first" and "second" examinations for English Schools, Scottish School Leaving examinations, School Certificate examinations for Northern Ireland, examinations for English and Scottish Universities and Belfast, examinations for the professions and Civil Service and other examinations, some of which are conducted by authorities other than local authorities and Government departments, but are approved by them.

Information is given under various cross headings and references are made to the secretaries and registrars of examining bodies for further inquiries.

Entwicklungshilfe als Psychologisches und Pädagogisches Problem Dargestellt am Plastischen Gestalten: Von ELSA KÖHLER UND WALTER BÖHM, UNTER MITARBEIT VON MARTA BERGEMANN-KÖNITZER. (Hermann Böhlaus Nachfolger, Weimar, 1936.)

The authors deal in a strictly scientific fashion with the "basic problem of all teaching," assisted development, and describe observations of two boys aged twelve and one aged ten and a half working with plasticine on models of men sitting and horses. Their teacher was always beside them, but at first did not attempt to influence them in any way. Gradually and carefully she began to offer criticism. The subjects retained perfectly the various processes and everything that had been said, so that the successes and failures of intervention by the teacher are made obvious. How are freedom in creating and assistance to be reconciled, in order to prevent too luxuriant a growth, and yet to permit development? This is the question which is brought somewhat nearer its answer by scientific observation.

B.H.

Die Geistige Wiederholung (Der Weg des Einzelnen und seiner Ahnen): By FREDERIK ADAMA VAN SCHELTEMA. (Published by the Bibliographisches Institut, Leipzig, 1937. 5,80 M.)

The author proceeds from the biogenetic hypothesis propounded by Haeckel in 1866 for natural sciences: ontogenesis is a short and quick recapitulation of phylogenesis. Progress in the research of the art of the Teutonic race and extensive studies in the psychology of childhood give the author material to formulate a similar hypothesis for mental sciences: the psychogenetic hypothesis. According to it a similar current flows between the development of the individual and the development of racial culture from the very beginning in the Nordic race. It is shown that the mental evolution of the Teutonic race from earliest times through the Middle Ages to modern times is similar to the corresponding stages of individual development from early childhood to youth and maturity.

To quote an example: the transition from consumption to production, from collecting to hunting and farming, which takes place with the transition from the palæolithic to the neolithic, corresponds to the end of the third year of life. The men of the Stone Age and the child are so similar to each other in their mental functions (drawings, etc.) that with good reason the author is entitled to speak of mental recapitulation.

It is a pity that the later periods (Middle Ages = youth, modern times = maturity) are dealt with so briefly. A survey illustrating the parallels and comparison of the art of the corresponding stages in racial and individual development are added to the book, which seems fitted to open up a new and profitable field of our mental sciences.

A.B.

Kinderfürsorge jenseits unserer Grenzen: By R. WEILAND. (Verlag Herm. Böhlaus Nachf., Weimar, 1937.)

The problems connected with the alarming decline in the birth-rate in the west and north European countries are coming more markedly to the fore. The tendencies of the liberal "laissez faire, laissez aller" are hardly in a position to cope with all the problems. The provisions made for living children must be raised to the highest standard possible. From this point of view the book will arouse great interest. It gives an excellent survey of the state of child welfare in Great Britain, Switzerland, France, and Spain. It is a pity that the extensive measures in authoritarian states are not dealt with.

A.B.

VOLUME VIII. NOVEMBER 1938. PART 3.

THE MOTIVE OF ACTIVITY

BY H. BOMPAS SMITH.

I.—*The meaning of motive.*
II.—*The agent's membership of his world.*
III.—*The will to good.*
IV.—*Summary.*

I.—THE MEANING OF MOTIVE.

THE term *motive* is generally used by psychologists, as it is in common speech, to denote a conscious impulse or desire which inspires some activity. When we observe people behaving we immediately tend to ask what *motives* " lie behind " their activities. The answer will contain such dynamic words as : wish, want, desire, urge.[1] This is, I hold, the legitimate meaning of motive, and I shall speak of motives in this sense. We must, however, include among motives subconscious desires or urges of which we are not specifically aware, but which are mental events of essentially the same kind as conscious motives in the usual sense.[2]

Sometimes, however, psychologists use the term *motive* with a different meaning. For example, Professor R. S. Woodworth in discussing the " maternal motive or mother love " attributes a mother's behaviour towards her new-born babe to her organic state, and more particularly to the presence in her body of a hormone which causes the spontaneous appearance of the milk with which to feed her child.[3] Here by motive he means an active tendency of the psycho-physical organism. He thinks of the mother as nursing or feeding her baby because her state of body and mind impels her to do so, not primarily because she desires to take care of the child and make him comfortable. Obviously the mother has this desire, but the desire itself is regarded as the result of her organic state. This point of view is important, but motive in this sense must not be confused with a conscious desire or urge, and would more appropriately be called an active organic tendency.

A third meaning given to *motive*, more especially by behaviourists, is that of a stimulus inherent in the situation which includes the organism and its environment. Professor M. W. Curti quotes with approval Carr's definition of a motive as "A relatively persistent stimulus that dominates the behaviour of an individual until he reacts in such a manner that he is no longer affected by it," and adds: "The term 'want' or 'need' is sometimes used as synonymous with motive, and this usage is consistent with the definition proposed above if these terms are used in a strictly objective sense, as referring to the underlying stimulating situation."[1] Here again we have a valuable point of view, but since motive in Professor Curti's sense is definitely not a felt desire, it would surely be better to be content with the term *stimulus*, as indeed many behaviourists are, though they are apt to speak of activities being "motivated."

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[1] W. J. H. SPROTT : *General Psychology*, pp. 10 f.
[2] See, e.g., DREVER : *The Psychology of Education*, pp. 20 f.
[3] *Psychology*, p. 251.

I have mentioned only three of the different meanings given to *motive* by writers on psychology, for my purpose is not to catalogue usages but to call attention to the danger of employing the word in a portmanteau sense in which incompatible meanings are confusedly combined. Various examples of such confusion might be given, but I shall deal only with the case of "hormic" psychologists who seem to make the best of both worlds by speaking of motives in either or both of the two first senses that we have distinguished. For instance, McDougall in his *Energies of Men* claims to teach "a frankly and thoroughly *purposive psychology*."[2] Now a psychology of this type is primarily concerned with our experience when we are mentally active, for purpose has no meaning unless it describes an agent's own experience. As the behaviourists rightly contend we cannot observe a purpose from outside, but only behaviour, which in the light of our own experience we may regard as inspired by some purpose. A motive ought therefore to mean a conscious purpose or desire. McDougall accordingly defines a motive as "a tendency working upon the level of self-conscious reflective activity."[3] This definition is not, I think, very happily worded, but at any rate it makes consciousness essential. In his book he discusses at length the development and results of motives as thus understood, and we gratefully recognise the value of his discussion.

But into this consistent treatment of his subject he introduces a totally different line of thought. He asks: "Why do you, why does any one, desire this or that or the other?"[4] and replies: "Because you are constituted in that way." We can hardly object to this rather obvious answer, but the implications which he reads into it seem open to serious criticism. As is well known, he holds that the constitution or structure of the mind includes certain active tendencies, called instincts or propensities "which are the primary grounds of all striving."[5]

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[1] *Child Psychology*, pp. 287 f.
[2] p. 23. [3] p. 135. [4] p. 25. [5] p. 26.

I do not think he calls these propensities motives, unless, as he assumes, they become conscious, but they are motives in the same sense as Woodworth's maternal motive, that is they are structural active tendencies, which in some way determine behaviour. Here, therefore, we approach the question of activity and its motive from quite a different angle. Instead of starting from the agent's experience we begin with the structure of his mind. We deal, not with mental events as such, but with the organic conditions that make them possible. If I investigate the motion of my fingers in writing, I may draw graphs showing the speed of various parts of my fingers, or I may discuss my fingers' anatomy. The two lines of approach are connected but quite distinct, belonging respectively to mathematical and anatomical universes of discourse. It would be equally absurd to say that a bone as such was a quick bone, and to say that my speed of writing was rheumatic. In the same way mental structure and the events on processes of mental life belong to different orders of things or realms of being.[1] We are conscious of the events, for they belong to the realm of conscious experience, but it is as illogical to say that mental structure is or can become conscious as it would be to predicate rationality of a bone in my arm. Mental structure is non-conscious or unconscious in the sense that the adjective conscious cannot be applied to it without talking nonsense. If I say that I am conscious of a tendency to be shy, what I mean is that I have felt shy in the past and expect to have the same feeling again on certain occasions. I am conscious, that is, of mental processes actual or imagined, but not of agoraphobia as an element in the structure of my mind.

In his desire to combine two points of view McDougall overlooks this essential difference between structure and conscious process. Indeed, his theory of mental activity is based on the assumption, which I do not think he either explains or defends, that a propensity can be " stirred, stimulated, aroused, or excited," so as to " generate an active tendency which may operate at any level in the scale of consciousness or awareness."[2] It is, however, as difficult to understand how a propensity can be converted into a conscious mental process, an actual event in mental life, as it is to imagine the force of gravitation becoming an actual falling body.

If it is contended that all he really means to assert is a causal relation between a propensity and a corresponding conscious process, the position is no less untenable. For two events can be causally connected with each other only if they belong to the same order of things and are " parts of a whole having such a unity that difference in one part makes a difference to other parts.'"[1]

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[1] See the clear statement in B. EDGELL : *Mental Life*, pp. 157 f.

[2] *Op. cit.*, p. 119. Compare his well-known definition of an instinct, *Outlines of Psychology*, p. 110.

There can, for example, be no causal relation between the rotation of the earth and my idea of immortality, simply because they are quite different kinds of things.

It is obvious that my mental structure has a vital bearing upon my conscious processes. I should not think and act as I do were I not the man I am. My contention is only that this fact cannot be explained on the lines I have been criticising. Very briefly, I am not the cause of my actions but do them, nor of my thoughts and feelings, but have them.[2] Also by thinking and doing things I make myself a rather different man who therefore does rather different things.[3]

That McDougall's theory of instincts does not fit into a purposive psychology is further shown by the fact that if you attribute an action to the working of an instinct you cannot consistently describe it as purposeful. For purpose is an event in conscious experience whereas instinct being an element of mental struction is non-conscious and therefore non-purposeful. Even if, for the sake or argument, we assume that an instinct can become a conscious urge, that urge would presumably be an awareness of a force impelling the agent from within or behind, not a goal to which he looks forward and outward.[4] The point is illustrated by a passage in Professor Burt's standard work on "The Young Delinquent." Burt holds that instincts "are the mainsprings of human conduct, the prime movers of all human life,"[5] and tells us that "the youth who gives way to a sudden gust of anger, the girl who succumbs to the physical promptings of sex, the infant who goes wandering away through a maze of streets . . . are urged, as it were, violently from behind, pushed blindly on by an unreasoning instinct to an unforeseen goal, half ignorant and wholly careless of the remote results of their semi-reflex impulses."[6] With the exception of the last clause this description is a logical application of his theory of instinct. It emphasises the blindness of the young delinquent's conduct, and their unconsciousness of the purpose of their actions. The last clause, however, implies, as the content clearly shows, that the writer is giving an account of the delinquent's own experiences. But for such an account the blind working of instinct is irrelevant. The passionate youth is surely moved by his desire to hurt the object of his wrath. The girl is carried away by a felt craving for a definite form of experience. The child is attracted by the mysterious glamour of streets calling to be explored. No doubt the ends aimed at are narrow and comparatively vague, but they are ends which at the moment are felt to be of overmastering importance, and the various actions are inspired by the conscious desire to achieve them. Burt's description is therefore untrue to life because he tries to combine two incompatible points of view.

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[1] G. F. Stout: *Mind and Matter*, p. 121. Prof. Stout's whole treatment of causality and 'the psycho-physical problem' are relevant to my argument. Compare also Whitehead's discussion of causality, e.g., *Process and Reality*, pp. 25 f.

[2] Compare Whitehead's theory of actual entities and prehensions.

[3] Compare F. C. Bartlett's schemata. *Remembering*, Ch. X. But I cannot claim his authority for my argument.

[4] Stout and others rightly deny that instinct is blind because they speak of instinct in the sense of an habitual embryonic purpose, which involves selective and prospective attention. See Stout's *Manual of Psychology*, pp. 342 f.

[5] p. 420. [6] p. 424.

It is unfortunate that the influential school of psychologists, of which McDougall, Nunn and Burt are such distinguished members, have based their general view of human activity upon this insecure foundation. Educational psychology is deeply indebted to these writers, but in my judgment they have tended to mislead us in two directions. Their doctrine that an agent's activities are primarily the result of his own instincts makes them lay one-sided stress upon the element of independence or self-assertion which all activity involves. The agent seems almost to be a self-moving unit in an alien world. " In every act," Nunn writes,[1] " we say to our world, openly or implicitly, " I am here and to be reckoned with ; I go a way that is, so far as may be, my own way and not merely yours." Secondly, their doctrine logically leads to the assumption that the agent strives to attain certain ends because to attain them satisfies his corresponding needs,[2] not because, as McDougall himself writes, they are intrinsically good.

Both these conclusions are, I hold, contradicted by the facts disclosed by analysing our experience. They are also irreconcilable with the outlook upon life which is generally accepted as the right one. I shall not labour his latter point but will only suggest that there is something wrong if in our method lectures we emphasise public spirit and the evil of self-seeking, while in our lectures on psychology we depict the boy as a relatively isolated agent intent on satisfying his individual needs.

In the next section I shall argue that we are active primarily as members of our world in particular situations, and not as self-asserting units. We shall then go on to consider the bearing of this fact upon the selfish or unselfish character of our motives. Throughout I shall speak of activity as known to us by experience, or from the standpoint of the agent, and of motives as being or involving desires for certain ends. We shall, therefore, be concerned mainly with conscious activity, though we have high authority for holding that all living activity is purposive. In fact, the standpoint I am advocating bears an interesting analogy to the teaching of Professor J. S. Haldane and other eminent biologists.

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[1] *Education*, p. 29.

[2] See *op. cit.*, pp. 26 f

II.—The agent's membership of his world.

We all agree that when we are active we respond to something other than ourselves and in turn act upon it. But we can interpret the process in two rather different ways. We may, like Nunn, think of it as primarily a process of self-assertion, or, more truly as I shall argue, we may regard it as a process in which we draw strength and stimulus from our environment and thus become able to act with relative independence. The distinction between these points of view is partly one of emphasis, but it involves a difference of attitude which is fundamentally important. For in the former case we start from an assumed antithesis between ourselves and the world, in the latter from a presumed initial unity with it. An adequate discussion of the issues which this alternative raises is obviously impossible within the limits of this paper. I shall therefore confine myself to an attempt to illustrate my point of view, not trying to cover the whole field, but taking as my text a typical example of voluntary activity.

We will suppose a new boy at school is playing his first game of Rugby football and that the captain of his side tells him to put his head down in the scrum and shove. The boy's initial response to this situation is to become aware of being involved or "embedded"[1] in what is going on. Probably he does not distinguish this vague sense of being affected by a situation which therefore has a value for him, from his further reactions to it, but Whitehead and others have called attention to the importance of this initial stage of activity as the source from which the whole process takes its rise.[2] At this stage we first become aware of the situation as one of which we are members by feeling what it is like, or, perhaps we may say, by feeling conformably with it, before we clearly know it as a whole of external objects and events. "Our developed consciousness," writes Whitehead,[3] "fastens on the sensum as a datum: our basic animal experience entertains it as a type of subjective feeling. The experience starts as that smelly feeling and is developed into the feeling of that smell." And again: "The primitive form of physical experience is emotional—blind emotion . . . In the language appropriate to the higher stages of experience, the primitive element is *sympathy*, that is, feeling the feeling *in* another and feeling conformably with another."[4]

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[1] The term is that used by W. Stern. His account of "Einbettung" (*Allgemeine Psychologie*, pp. 103 f. *et al*) seems to me important.

[2] Compare also F. H. Bradley: *Essays on Truth and Reality*, pp. 180 f.

[3] *Adventures of Ideas*, p. 315.

[4] *Process and Reality*, p. 227.

The point I wish to stress is that when we first begin to be active we do not approach the situation from outside saying, " Here I am and there you are and now I am going to change you," but we start with a sense of belonging to the situation. This sense is implicit in the first thing we do, namely to adapt ourselves to it or conform to its demands. To quote Whitehead once again : " The perception of conformation to realities in the environment is the primitive element in our external experience. We conform to our bodily organs and to the vague world which lies beyond them. Our primitive perception is that of ' conformation ' vaguely, and of the yet vaguer relata ' oneself ' and ' another ' in the undiscriminated background."[1]

The vague awareness of " oneself " and " another " is a necessary element in all conscious activity, and the initial stage of which we have been speaking marks the first step in the agent's differentiation of himself from his environment. In the second stage of activity this differentiation grows much more definite, though it remains a differentiation within the situation as an inclusive whole. If we return to our boy on the football field we can distinguish two aspects of his experience. He knew that he was playing in an actual game in which the situation at the moment centred, so far as he was concerned, in what his captain told him to do. He looked at or knew this situation from outside as one given in the world of actual objects and events. But at the same time he felt that he was himself active in doing something about the situation and making changes in it. These two lines of thought and feeling and activity were combined in his experience of being an active member of the actual situation with which he had identified himself.

The situation as the boy knew it from outside became an organised whole by a process familiar to all students of psychology. But this situation was real and actual because the persons and things in it were acting upon each other in the same way as they acted or might act upon himself. It was this actual activity which gave the situation its value or importance. Things were being done which made a difference in the world. What Whitehead calls the causal efficacy of what we see, experienced in our sense of having to conform to the situation, is what makes us appreciate its reality and value.[2] Even when we look at stationary objects we tend to see them as about to change or as resisting change. The gun looks as if it might go off. The rock looks very firm.[3]

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[1] *Symbolism*, p. 51. On the function of our bodies as belonging to the external situation, transmitting its influence and our own reactions to it. See G. F. STOUT : *Mind and Matter.*

[2] See his *Symbolism*, p. 62. Compare A. CAMPBELL GARRETT : *Reality and Value*, Ch. II.

[3] See H. H. PRICE : *Perception*, pp. 161 f.

The boy's situation was therefore essentially changing and dynamic, and just as the players were active with a purpose so the whole game developed in a purposive way. Its state at the moment was the outcome of its immediate past, moving towards its immediate future, but it did not change at random. It changed as an organised whole towards being a good game or the reverse, and the changes were important because they either increased or lessened its value. The question inherent in the situation was whether it was changing, or could be made to change, in the right direction. This question was not raised by the boy on his own initiative. It confronted him as a necessary aspect of the situation itself, which he envisaged not merely as it was at the moment, but as it might become. In other words the situation had a possible value which would become actual if the game went the right way.

The boy, however, did not become aware of this possible value simply as a possibility in the scheme of things with which he was not directly concerned. For it is a fundamental law of life that when we see a positive value which may be made actual, we feel inspired to play our part in bringing about the needful change. If there is something we feel ought to be done, and we can do it, we feel called upon to act accordingly. It might even be shown that this sense of being called upon to make the situation better is the basic motive in all our activities. Every situation to which we are not indifferent has what the Gestalt-psychologists call a gap to be closed, or in Stern's language a challenging or inviting character.[1] It makes a demand upon us which we cannot choose but hear, though the urgency of the demand depends upon the strength of our interest in the situation, that is upon the importance or value which we feel the situation possesses. In short the situation which the boy saw and knew was one of actual activity in which he felt called upon to bear a part in order that the situation might develop in the right direction.

So far we have been speaking primarily of the boy's experience of the situation as outside or other than himself. But even if he stood still for a moment and simply watched what was going on, his mind was active all the time and he felt, without giving much attention to the feeling, that he was thinking about the game. The feeling was one of being active in body as well as in mind and was probably a form of bodily sensation.[2] In any case he felt himself actively responding to the call of the situation, because it was worth while to do so. His initial response, as we have seen, was primarily emotional, but it soon became a more or less definite attitude towards the actual situation,[1] which developed into a way of approaching or addressing the situation comparable to the way in which a golfer addresses his ball.[2] These preparatory stages may or may not have been distinguishable in the boy's particular case, but they issued in the more definite purposeful activity by which he took an actual part in the game, of which we shall speak below.

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[1] "Aufforderungscharakter." See his *Allgemeine Psychologie*, e.g., pp. 125 f.

[2] See, e.g., G. F. STOUT : *Mind and Matter*, pp. 157 f.

Of these two elements in the boy's experience one or other may be more dominant. He may tend to watch the game as a spectator or he may throw himself into the struggle without clearly knowing what the position is. But the two elements obviously imply each other and their intimate connection need not be worked out in detail. The difference between them developed as the boy's appreciation of the situation grew more definite and vivid, though they were throughout elements in one comprehensive experience. Their underlying unity took definite shape in the boy's mind in the act of will by which he identified himself with the situation as an active agent in it. He heard the call of the situation as at once a call which came to him from without and a voice in his own mind, and he answered the call, not because he was compelled to do so by some external force, but because he himself felt he wanted to play his part in the game. His motive was his sense of the importance of closing the gap in the situation, of making its possible value actual, of changing it for the better, but his motive was his own motive felt by him as such.

The boy therefore willed freely, for he willed to do what he himself felt to be important and the right thing in the way he felt to be best. But he willed freely in proportion to the completeness with which he identified himself with the situation. If he went into the scrum reluctantly he had a sense of compulsion, but there was no trace of compulsion if he went in wholeheartedly. For when we will in the full sense of willing we transcend a sharp antithesis in our experience as a whole. On the one hand we are aware of what Ach calls the " actual " element in willing. If we put the feeling into words we should say, " I really or truly will."[3] This element involves what Aveling speaks of as a sense of self-actuality.[4] As Nunn puts it, we say to our world, " I am here and to be reckoned with." But the I of which we thus become vividly aware is an I actively bent on doing some particular thing, and we are equally conscious of the reality and value of the end to be attained. The two elements are combined in our vivid sense of ourselves as active members or organs of the real situation.

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[1] See F. S. BARTLEET's experiments on perceiving. *Remembering*, pp. 29 f. *et al.*

[2] B. PETERMANN uses the term Ansprechen. *Das Gestaltproblem*, esp. pp. 170 f.

[3] See his *Ueber die Willenstatigkeit und das Denken.*

[4] F. AVELING : *Personality and Will*, p. 102.

When we thus become members of the situation we do not merely make its final purpose our own, but identify ourselves with the process by or in which that purpose is achieved. For the situation is always in process of development, and when we throw ourselves into it, our motive is to help it to become what we would have it be. The boy wanted to do his part in making the scrum go well. But a situation develops as it ought by actually becoming better. It is the process that matters no less than the end to be attained. The scrum is a good scrum when the boys in fact push and feel rightly. The distinction between means and end loses its meaning and the end aimed at is " a line and not a point."[1] This partial or almost complete identity of process and attainment[2] is experienced in our sense of satisfaction when we feel our activity to be valuable for its own sake, irrespective of its success. It is more satisfactory to play a good game and lose than to play a bad game and win. So Professor Valentine defines play as " any activity which is carried out entirely for its own sake," and writes that " to the child the activity and the pleasure are inseparable at this early stage."[3]

We are all inclined to think of the end aimed at in activity too exclusively as a *terminus ad quem*, and McDougall appears to do so in his theory of activity. This error is avoided if we realise that the agent is active as a member of a developing situation in which what matters most is the actual process of advancing. We then see why we " love the game beyond the prize," value interest in a subject more than information about it, and respect a dull boy's efforts even if they have scant success. We may also possibly understand Thorndike's *Law of Effect.*

Aveling's experiments[4] apparently show that our activity in willing is effortless. Perhaps we may view it as the renunciation of our individual selves by which we attain true freedom. It should therefore be distinguished both from the preliminary process of making up our minds, which may or may not be laborious, and the subsequent carrying out of our resolve by which we seek to realise in actual fact our active co-operation with the situation of which we had a vision. It is at this stage that Webb's "persistence of motives" becomes so important.[5] The resulting harmony with the situation is recognised by our feeling of satisfaction.

This lengthy description of our experience when active has probably been unnecessarily detailed and is doubtless open to amendment, but unless it is fundamentally erroneous it goes some way towards showing that we act as members of situations and not as confronting them from outside. It follows that, speaking generally, our motive is to make a situation better rather than to satisfy our individual needs. This inference I shall try to substantiate in the next section, but two remarks may be made in passing. If my argument is substantially sound, a voluntary act is an incident in the general process of evolution, and shares the fundamental characteristics of that process. For in evolution unorganised wholes develop into organised articulated wholes in which each unit plays a relatively independent part in a higher type of unity,[1] and this is just the process we have been describing. It is also interesting to notice a certain similarity between the standpoint I am advocating and that of modern physics, in which the conception of independent units acting upon each other from outside has been superseded by a theory of fields in which activity takes place and in which material things are essentially centres of energy.

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[1] See B. BOSANQUET : *The Principle of Individuality and Value*, pp. 123 f. and compare the meaning of τέλος in Greek philosophy.

[2] The extent to which the two are identical varies according to the character of the situation. See BOSANQUET *loc. cit.*

[3] This *Journal*, Vol. VIII, part II, pp. 188 and 190.

[4] *Op. cit.*, Ch. V.

[5] See his " Character and Intelligence."—*Brit. J. of Psy.*, Monog, 1915.

III.—THE WILL TO GOOD.

When McDougall writes that animals, including men, strive for certain natural goals, the attainment of which satisfies their corresponding needs,[2] he does not distinctly state that the desire to achieve satisfaction is the motive of their activity. This is, however, the inference which, I suppose, most of his readers would draw if they thought about the question, and it is one which logically follows from the premises. If, for example, I am moved by my instinct of curiosity to examine a strange object, my primary motive is to satisfy my curiosity, and any interest I may feel in the object itself is subordinate and derivative. The same conclusion is at any rate suggested by McDougall's definition of a motive as " such a tendency as we feel actively at work within us when we are hungry, or curious, or angry, or afraid ; "[3] and it seems to be assumed in his discussion on the Law of Effect.[4] On the other hand we read that " what we desire and strive for is the object itself, the food, the shelter, the victory, the glory, the good of another," because we regard such things as intrinsically good and desirable.[5] With this statement I wholeheartedly agree. It shows how much truer a man's insight may be than the theories by which he explains it.

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[1] For the application of this principle in psychology see C. S. MYERS : *A Psychologist's Point of View*, Ch. II, and B. PETERMANN : *Das Gestaltproblem*, pp. 65 f.

[2] *Energies of Men*, p. 26.

[3] *Op. cit.*, p. 64.

[4] *Op. cit.*, pp. 352 f. Compare his *Outline of Psychology*, pp. 193 f.

[5] *Energies of Men*, p. 25.

Hormic, as also Behaviourist, psychology, appears to me to exert an unfortunate influence in this particular field just because it does not work out its principles to their logical conclusions. If you start from the individual agent's tendencies and needs and his reactions to an environment external to himself, you almost inevitably assume that his activities are in the end inspired by self-interest in a wide and ethically neutral meaning of the term. Unless our attention is called to the point, we hardly realise how difficult it is on this assumption to do full justice to man's higher life of self-sacrifice and devotion to ideals.

We are the more inclined to assume the primary of self-interest because we all agree that the motive of voluntary action must be the agent's own motive, and the end aimed at must be an end of which he feels the value. Further, all of us very often, and some of us nearly always, are moved to action chiefly by our personal interests and the appalling effects of individual and corporate self-seeking are so obvious and widespread that selfishness may seem the outstanding characteristic of human life.

Of these facts we must take account, but I believe we can do so while still maintaining that unselfishness is primary and selfishness abnormal. I am not, however, attempting a philosophical explanation of evil or morbid selfishness, but simply trying to give some account of the motives which inspire us to act in various ways.

In the previous section I argued that we act as members of situations with the primary motive of making their possible values actual. If my contention is sound, we are moved in principle, or on the whole, not by self-interest but by our response to the value of some end byond our own well-being. This conclusion is, I think, substantiated by reflection on the facts of life. The living world as we know it could not continue to exist unless, on the whole and with many exceptions, men were inspired, not by purely personal motives, but by what Plato called the will to good. Even in the biological world this principle holds good. "The farther we go in our studies of flower anatomy," write Thomson and Geddes, "the more we find of this subordination of the vegetative life by the reproductive," and "the same preponderance appears in animals."[1] In the case of mankind it is obvious that no child could survive were it not for its mother's self-sacrificing love. You may explain her love as expressing her maternal instinct, but to assert that when inspired by it her primary motive is her own satisfaction, and not the welfare of the child, seems to me as paradoxical as to attribute the readiness of a tigress to give her life for her cubs to her inborn desire for a happy existence. It is because the mother wholly identifies herself with her child that the child's well-being becomes her own. Again, no society, from a family to a nation, can endure unless its members to some extent subordinate their own interests to the interests of the whole, and in all great religious and social and political movements, including Fascism and Naziism, the leaders have appealed, not to self-interest, but to enthusiasm for some ideal end of such overmastering importance that their followers were prepared to sacrifice themselves to forward its achievement.

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[1] *Evolution* (Home University Library), pp. 238, 245. See esp. pp. 245 f.

But if this is the law of life, can we account for both legitimate and illegitimate self-interest? We can do so, I think, if we give due weight to the fact that when we appreciate the value of an end to be attained, our experience varies according to the type of value we have in mind. Taking the case of the boy playing football we will first assume that his motive was primarily in making the game a good one. The game then had for him an intrinsic value. It existed in its own right and was, in a sense, an end in itself. Its possible intrinsic value was fully realised in so far as it was a really good game, the game it ought to be.[1] A vague sense of the intrinsic value of objects and situations seems to be an element in all perceiving and all interest,[2] but it becomes a definite motive only when we are active members of a situation as a whole, including its background in the scheme of things. We then feel that the call to realise the situation's intrinsic value has a specially imperative character which demands our obedience at almost any cost. If we do not obey the call we not only err but sin. On the other hand if we act in accordance with this motive we feel the highest and most lasting form of satisfaction. When at the end of the match the boy felt that he had done his level best to play the game as it should be played, his satisfaction was of a higher and most lasting kind than his dissatisfaction with the bruises he had got.

The intrinsic value of an object or situation can, however, only be known by the influence it exerts upon other things and more especially on people.[3] An object therefore has value in the secondary sense of being important or making a difference to the people concerned. The boy was vividly aware of the intrinsic value of the game because he was involved in it, and the game made a difference to him because it was the game it was. He came within its sphere of influence or field of energy, and responded by feeling an interest in it and trying to make actual its possible value for himself. So long as he felt that the game's value for him depended upon its intrinsic value, that is upon its being a good game, his personal interest in it expressed his sense of being a member of it, and his desire to realise its possible value for him was indistinguishable from his desire to make the game a good one. On the other hand if he thought of himself as a separate person, and of the game's value for him as distinct from its intrinsic value, his motive would be the narrowly personal or selfish one of saving his own skin.

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[1] On the principle involved see J. LAIRD: *The Idea of Value*, esp. pp. 255 f.

[2] See A. N. WHITEHEAD: *Science and the Modern World*, Ch. V, esp. p. 131.

[3] See two interesting passages in W. MACNEILE DIXON: *The Human Situation*, pp. 319 f. and 366 f.

But, in the third place, the boy's dominant motive might be to help his side to win the game, whether by fair means or foul and at any cost to himself. He then appreciated what we may call the social value of the game, that is, its importance for the people involved, so far as he identified himself with them, and not exclusively or even mainly for himself.

The relations of these types of value to one another cannot be here discussed. It is enough to say that while as a rule we do not clearly distinguish them and therefore act from mixed motives, the ethical traditions of mankind confirm our own awareness of the superior claims of intrinsic and social values to those which are purely personal. The fundamental motive of human life is Plato's will to the good, of which self-interest is a debased and misguided form, or even an absolute perversion.

Selfishness is so prevalent because it is easy to take a narrow view of a situation and appreciate only its face value to ourselves. It is correspondingly difficult to throw ourselves into a situation and become active members or organs of it as a whole. The position is further complicated by the fact that some situations matter to us personally very much, and their intrinsic value is seen chiefly in their value for ourselves. Moreover some people naturally tend to stand aloof from situations or to approach them from their own individual standpoint and act on them from outside. They are therefore strongly tempted to be selfish.

The practical problem is how best to encourage unselfish and effective willing, and here the general conclusions at which we have arrived help to explain and justify the methods followed not only by good schools, but by all successful leaders of great movements. The tradition of appealing to self-interest is deeply rooted, but great educators have proved that self-interest is a less effective motive than the call of some high aim of which the intrinsic or social value is keenly felt. Teachers know well that the fundamental method of moral training is to lead boys to absorb themselves in the situations in which they act, for example by sharing the life and ideals of their school. Exhortation and the insistence on obedience to external authority and rules are undoubtedly necessary at times, but they are subsidiary methods because they tend to make boys view the situation from outside. All this is common ground, but I think we do not always realise that the example of great teachers shows how the same principles apply in the activity of effective learning. When, for instance, Plato's Socrates wanted his hearers to grasp the meaning of justice, he asked them questions which led them to give their whole minds to the subject. But his purpose was not to arrive at a formal or external definition which they could enter on their tablets, like a summary on a blackboard. He aimed rather at helping them to live the situation as active members of it by feeling what it was like to be just or unjust, and by creating in their thoughts an ideal of justice of which they would feel the call in actual situations.[1]

Finally, the point of view I have outlined, apart from its detailed applications, seems to be in harmony with the spirit of chivalrous adventure which is characteristic of all good schools. This fact, if fact it be, is important. For educational psychology ought to be true not only to the details of school experience but also to its wider and deeper sides. But it will be so only if its essential methods of observation and experiment are supplemented by a reconsideration of the more fundamental concepts by which we interpret their results. This paper has dealt with one such concept which seems to need further investigation. My provisional conclusions may appear iconoclastic, but they are propounded in no dogmatic spirit. " In philosophical discussion," to use Whitehead's words, " the merest hint of dogmatic certainty as to finality of statement is an exhibition of folly."

IV.—SUMMARY.

In this article I have outlined a view of the motives of voluntary actions, contrasting it with the theory of instincts propounded by McDougall and others. We must, I have urged, draw a sharp distinction between a motive in the proper sense of a conscious desire to attain some end and a motive in the sense of an active tendency inherent in the structure of our minds. The confusion between the two meanings is due to a failure to realise that mental structure and conscious process belong to different realms of being. An element in our mental structure, such as an instinct, can never be or become a conscious process or desire, nor can it be a cause of such a process. If we attribute an action to the working of an instinct we deprive it of the purposeful character of which the agent is directly aware. Further, the view that instincts supply the basic motives of human activity leads us to think of an agent as acting on situations from outside, whereas an analysis of our experience when voluntarily active shows that we begin by feeling ourselves members of a situation, then distinguish ourselves from it, and finally by an act of will make its demands our own. Our motive is therefore in principle our desire to make the possible value of the situation actual and not any form of self-interest. The prevalence of selfishness shows the weakness of human nature, but it does not disprove this fundamental principle, the truth of which is attested by the experience of mankind.

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[1] I owe the example to J. STENZEL : *Platon der Erzieher*, pp. 169 f.

RÉSUMÉ.

DU MOTIF DE L'ACTIVITÉ.

Il faut distinguer entre un motif au sens d'une impulsion ou un désir sentis, et un motif au sens moins légitime d'une tendence à l'activité, inhérente à la structure de l'âme ou de l'organisme psychophysique. McDougall et d'autres confondent ces deux idées du motif parce qu'ils ne reconnaissent point la différence entre la structure mentale et l'activité consciente comme des événements reels dans la vie mentale. Mais si l'on atrribue une action au fonctionnement d'un instinct inné par exemple, il faut la considérer comme étant sans but, et comme l'œuvre d'un agent qui se tient en dehors de la situation, mû par l'intérêt quelconque. Or les actions volontaires ont un but et l'agent fonctionne comme membre de la situation, avec la tendance générale de l'améliorer, c'est à dire d'en réaliser la valeur potentielle.

ZUSAMMENFASSUNG.

BEWEGGRUND ZU EINER TÄTIGKEIT.

Ein Beweggrund im Sinne eines empfundenen Triebes oder Verlangens muss von einem Beweggrund im weniger berechtigten Sinne einer dem Bau des Geistes oder des psychophysischen Organismus innewohnenden tätigen Neigung unterschieden werden. Diese beiden Auffassungen eines Beweggrunds werden von McDougall und anderen verwechselt, weil sie den wesentlichen Unterschied zwischen geistiger Struktur und bewusstem Verfahren als wirkliche Begebenheiten im Geitesleben nicht anerkennen. Wenn man aber eine Handlung dem Funktionieren z. B. eines angeborenen Instinkts zuschreiben soll, so müssen wir das als unabsichtlich, und als die Handlung einer Wirkung betrachten, die einer Situation gegenübersteht und von einer Art Eigennutz veranlasst wird. Tatsächlich sind freiwillige Handlungen absichtlich und die wirkende Kraft ist tätig als Teil einer Situation mit dem allgemeinen Antrieb sie zu verbessern, d.h. ihren möglichen Wert zu verwirklichen.

AN INVESTIGATION OF THE RELATIONSHIP BETWEEN RATE AND QUALITY OF HANDWRITING IN THE PRIMARY SCHOOL.

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I.—*The problem.*
II.—*Rate of writing*:
  (*i*) *Preliminary test.*
  (*ii*) *The test material.*
  (*iii*) *The test adopted.*
III.—*The choice of a scale for measuring quality.*
IV.—*Results for the various age groups.*
V.—*General conclusions.*
VI.—*Summary of results.*

I.—THE PROBLEM.

IT is now universally recognised that the handwriting of adults and children varies from time to time, and speed has been regarded as the most important factor in these variations. I discovered that children in particular, had different standards of writing in doing different exercises, and that these standards appeared to be affected by the rate at which they had to write. For example, children generally wrote better when the exercise was purely one of penmanship or of dictation, than was the case in composition exercises and examination papers, when several good writers often showed an amazing decline in quality.

I decided therefore that I would investigate whether there is a significant correlation between speed and quality of writing at the various stages in the primary school, and to what extent these two factors vary with advance in age.

II.—RATE OF WRITING.

To find such a relationship these two aspects must be measured. Rate is measured by finding the number of letters written in one minute.

(*i*) *Preliminary test.*—My first material was a sentence containing all the letters of the alphabet, " Jump lazy fox view the quacking birds," and I followed Starch's[1] method of making the children memorise it and then write, continuously, for two minutes. The results taught me many pitfalls to avoid and defects to remedy. The word " view " was unfamiliar to many in this context, while the close association of *z* and *x* led to the need for increased concentration and a slowing down of the writing process. By the end of the period the children had just acquired the correct mental set towards their work.

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[1] STARCH, DANIEL: *Educational Measurements*, p. 60.—The Macmillan Co., New York, 1917.

(*ii*) *The test material.*—Considering how great is the effect of mental preparation I decided to adopt the procedure of later investigators such as S. Monroe Graves,[1] and of more recent tests such as the American Handwriting Scale Test[2] where stress is laid on giving a short practice of the test before the test proper is given, in order that subjects may have the correct mental set. Material had to be meaningful and yet not too long. One point which I thought ought to receive particular attention was the choice of the letters in the material to be written. Neither Starch, Graves nor others give an explanation of their choice, though West bases his on an analysis of vocabulary studies and word lists. I decided to base my selection on the frequency with which the letters of the alphabet occur in ordinary written material. From the founts of *The Glasgow Herald* I obtained the frequency of the use of the letters. My reason for using this letter count was that since it was obtained from a paper of Scottish origin and circulation it would probably be most applicable to the words used in Scottish schools. I then evolved the sentence " Come forth bright sun, waves darkly leap," which contains all the letters except those of least frequent occurrence, *j*, *q*, *x*, and *z*, while *e*, the letter of most frequent use, occurs oftenest followed by those next in order of frequency, *a* and *r*.

(*iii*) *The test adopted.*—My subjects were 172 children whose ages ranged from 8 to 12 years, and I standardised the application of the test. The children had to memorise the sentence which had been written on the blackboard and explained, and as an aid were allowed to practise writing it. A practice test was given, the sentence having been erased from the blackboard as copying or dictating would interfere with the speed of writing.[3] The instructions to the subjects conformed to those given in the "Manual for the American Handwriting Scale," being " Write as you usually do, but do as well as you can. This is a test to see how rapidly and *well* you can write." The time limit of two minutes' continuous writing allowed of an adequate sample without causing the child fatigue, while the familiar instruction to write as they usually did obviated the test being made unreliable by the subjects being given unusual directions.[1] After this the test proper was given with exactly the same procedure.

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[1] GRAVES, S. MONROE: "A Study in Handwriting."—*Journal of Educational Psychology*, 7, 1916, pp. 181-190.

[2] WEST, PAUL V.: *Manual for the American Handwriting Scale.*—The A. N. Palmer Co., New York, 1929.

[3] STARCH, DANIEL: *Educational Measurements*, p. 75.—The Macmillan Co., New York, 1917.

III.—THE CHOICE OF A SCALE FOR MEASURING QUALITY.

Burt[2] has noted that quality can be measured in quantitative form only by recourse to some statistical device, and I had many scales from which to choose. Previous investigations have on the whole used Thorndike's[3] scale. This, however, does not differentiate between standards at different age levels, while the vertical placing of specimens causes confusion. Ayres' scale, based purely on legibility, suffers from the fact that handwriting has changed in the last twenty years, while Freeman's[4] with its ranking and analysis of the different elements of form in writing seems unnecessarily complicated.

Handwriting no longer requires to be perfect copperplate, and modern practice has tended to simplify the letter forms and concentrate on the correct formation of the written characters. My specimens were of this type and so I had to compare them with samples of the modern trend in writing. I chose " The American Handwriting Scale."[5] devised in 1929 by Paul V. West, Professor of Education in New York University, which consists of seven scales, one for each school grade from the second to the seventh. For accurate work three ratings were made independently, and the average score taken.

Having scored each specimen for speed in letters written per minute, and for quality, the mean for each aspect was taken and the standard deviations computed. The coefficient of correlation between speed and quality was then calculated, using the Bravais-Pearson formula, and noting the Sampling Error.

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[1] GATES, A. I. : " The Relation of Quality and Speed of Performance : A Formula for Combining the Two in the Case of Handwriting."—*Journal of Educational Psychology*, 15, 1924, pp. 129-144.

[2] BURT, CYRIL : *Mental and Scholastic Tests*, p. 307.—P. S. King and Son, Ltd., London, 1921.

[3] THORNDIKE, E. L. : " Handwriting."—*Teachers' College Record*, XI, March, 1910.

[4] FREEMAN, F. N. : *Chart for Diagnosing Faults in Handwriting.*—Houghton Mifflin Co., Boston, 1914.

[5] WEST, PAUL V. : *The American Handwriting Scale.*—The A. N. Palmer Co., New York, 1929.

IV.—RESULTS FOR THE VARIOUS AGE GROUPS.

TABLE I.

(Age means, mean deviations, standard deviations and correlation coefficients for speed and quality of handwriting for pupils 8 to 12 years of age.)

SPEED.						
Age.	*No. of Subjects.*	*Range (words per min.)*	*Median.*	*Mean.*	*Mean Deviation.*	*Standard Deviation.*
8	33	5·0–22·5	11·5	12·8	3·75	4·43
9	31	7·0–37·5	16·5	17·5	4·7	6·7
10	30	7·0–38·0	21·5	23·4	6·73	8·5
11	47	8·5–49·5	24·0	25·5	6·5	8·8
12	31	16·5–34·0	24·0	24·0	5·06	5·9

QUALITY.					CORRELATION.
Age.	*No. of Subjects.*	*Mean.*	*Mean Deviation.*	*Standard Deviation.*	
8	33	76·0	6·0	7·07	·62± ·11
9	31	76·6	8·09	9·05	·51± ·13
10	30	77·0	8·0	9·4	·39± ·15
11	47	73·0	5·9	7·7	·49± ·11
12	31	72·6	5·61	7·4	·68± ·09

V.—GENERAL CONCLUSIONS.

Speed increases from age 8 to 9 by 4.7, and from 9 to 10 years by 5·9, after which the rate of increase slows down and the 11-year-old group exceeds the 10-year-old by only 2·1 letters per minute. At every age except 12 (when they were equal) the median rate was less than the mean speed and this former score increased irregularly from grade to grade. See Table I and Graph I.

The significant increase in mean speed which occurs between the ages of 8 and 9 may be due, as Freeman[1] holds, to the child being able to concentrate on the meaning of the material so that in measuring speed the investigator is measuring a habit. This would account for the gradual increase in speed with perfection of the habit, and the decrease at the age of 12 might be due to this being a period of adjustment, when the child having overcome all the technicalities of writing now experiments and begins to develop an individual style.

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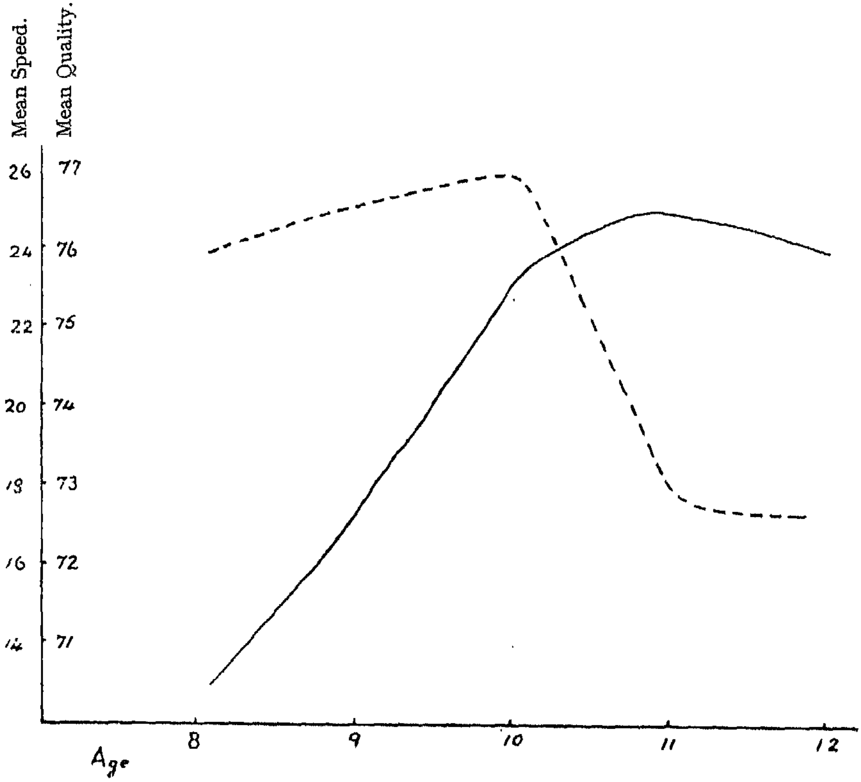
[1] FREEMAN, F. N.: *The Teaching of Handwriting*, p. 30.—Houghton Mifflin Co., Boston, 1915.

The highest arithmetical mean and the widest range in variability of speed (sigma= ±8·8) appear at the age of 11 years, results similar to those noted in Viennese children's handwriting by a recent investigator.[1]

GRAPH I.

(To show relation of Quality to Rate of Handwriting for pupils 8 to 12 years of age.)



- - - - - Quality according to scale.
——— Rate in letters per minute.

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[1] ROMAN, KLARA G.: " The Development of Writing Speed and Point Pressure in School Children."—*Journal of Genetic Psychology and Pedagogical Seminary*, 49, 1936, pp. 139-160.

Quality shows a slight advance yearly until the age of 10 years, after which there is a decrease and it becomes less than that of the youngest age group. The greatest amount of variation among the individual results occurs at 10, so that quality seems to reach its peak before speed by one year. There is a very small difference (·4) between the mean quality for age groups 11 and 12—a finding also noted by Nifenecker.[1]

The slight decrease in quality from 10 years of age onwards is probably due to less emphasis being laid on the writing lesson and the child being forced by circumstances to increase his speed of writing.

I cannot discover any figures showing the correlation between speed and quality for British children, but Thorndike concluded that the rapid writer would on the average do writing of a higher quality than those who wrote at a low speed.

Speed and quality, however, do not advance regularly and concomitantly with increase in the age of the primary school child; speed advances more rapidly, and there is much overlapping among the various age groups.

Since the correlation coefficients in all the groups are low and there is so much scatter within the grades with regard to both speed and quality it seems impossible to reduce these two quantities to Gates'[2] single score of $\sqrt[3]{\text{rate} \times \text{quality}}$, as this formula would need to be related to a particular scale, while Courtis'[3] finding that ability is equal to the mean average of rate and quality does not hold, as a person could score 25 for ability if his rate were 50 letters per minute though his quality score was zero.

Such a combined score would need to weight speed and quality, and this combined score would not be diagnostic and therefore of little importance for rating. Unless it is known at what speed a person writes well, one cannot assess his ability properly.

It has been noted that good writers tend to write more rapidly, and teachers would do well to aim at making their pupils achieve handwriting which combines legibility with a fair degree of speed.

VI.—SUMMARY OF RESULTS.

(1) At every age level there is a well-defined tendency for normal speed and quality to vary together, as is shown by the positive coefficients of correlation which are significant. This relationship does not hold between age groups however.

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[1] NIFENECKER, EUGENE A.: "Grade Norms for the New York City Penmanship Scale."—*Journal of Educational Research*, 2, 1920, pp. 808-827.

[2] See reference above.

[3] COURTIS, S. A.: "The Relation between Rate and Quality in Educational Measurement."—*Journal of Educ. Research*, 10, 1926, p. 110.

(2) There is a significant increase in mean speed with age up to 11 years, after which the slight decrease is also significant.

(3) It is significant that the greatest amount of deviation among individual rate scores is found at the age of 11 years, sigma being 8·8, with a standard error of ±·91.

(4) The significant increase in quality is slow and accompanies increase in speed up to the age of 10 years, after which there is a decrease at age 11, while the latter and the 12-year-age group show little difference in quality, the means in every case being significant.

(5) The greatest amount of variation in quality occurs at the 10-year-old level, where the standard deviation of 9·4 is significant, its standard error being ±1·21.

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RÉSUMÉ.

UNE RECHERCHE SUR LE RAPPORT ENTRE LA RAPIDITÉ ET LA QUALITÉ DE L'ÉCRITURE DANS L'ÉCOLE PRIMAIRE.

Dans cette étude du rapport entre la rapidité et la qualité de l'écriture dans l'école primaire les sujets étaient 172 enfants dont l'âge variait de 8 à 12 ans. Ils durent écrire aussi vite et aussi bien que possible pendant deux minutes la phrase, " Come forth bright sun, waves darkly leap." Après un test préliminaire l'on calcula la rapidité en comptant le nombre des lettres écrites par minute dans le test même. La qualité fut mesurée par le American Handwriting Scale.

Les résultats obtenus montrent qu'il y a une tendance marquée à ce que la rapidité et la qualité varient ensemble ; les coefficients de corrélation à chaque âge sont positifs et significatifs, bien que ce rapport n'existe plus entre les différents groupes d'âge. La rapidité montre une augmentation significative jusqu'à l'âge de 11 ans et une légère diminution significative au niveau de 12 ans. Le plus grand écart parmi les notes de rapidité individuelles se trouve à l'âge de 11 ans.

L'amélioration de la qualité est lente et accompagne l'augmentation de la rapidité jusqu'à l'âge de 10 ans, ensuite il ya une légère détérioration à 11 ans, et ce groupe ne varie que peu, quant à la qualité, du groupe de 12 ans. La plus grande variation dans la qualité se trouve à l'âge de 10 ans.

ZUSAMMENFASSUNG.

EINE UNTERSUCHUNG DES VERHÄLTNISSES ZWISCHEN DER SCHNELLIGKEIT UND DER QUALITÄT DER HANDSCHRIFT IN DER ELEMENTARSCHULE.

In der Untersuchung waren die Vp. 172 Kinder im Alter von 8-12. Sie mussten möglichst schnell und gut den Satz : " Come forth bright sun, waves darkly leap " zwei Minuten lang schreiben. Nach einem Vortest errechnete man die Schnelligkeit dadurch, dass man die Zahl der im eigentlichen Test pro Minute geschriebenen Buchstaben zählte. Die Qualität wurde mit der Amerikanischen Handschrift-Skala gemessen.

Die erzielten Ergebnisse wiesen auf eine klare Neigung zu gleichzeitigem Variieren normaler Schnelligkeit und Qualität : die Korrelationskoeffizienten bei jedem Altersniveau sind positiv und bedeutend, obgleich dieses Jerhältnis zwischen Altersgruppen nicht standhält. Die Schnelligkeit zeigt eine bedeutende Zunahme bis zum 11. Jahr und eine geringe, aber deutliche Abnahme beim 12-Jahr-Niveau. Die grösste Abweichung unter einzelnen Schnelligkeitsergebnissen kommt mit dem 11. Jahr vor.

Die Zunahme in der Qualität ist langsam und begleitet die Zunahme in der Schnelligkeit bis zum 10. Jahr. Danach zeigt sich eine geringe Abnahme mit 11 Jahren. Diese Gruppe weicht in der Qualität wenig von der Gruppe der Zwölfjährigen ab. Das grösste Variieren kommt in dem 10-Jahr-Niveau vor.

INTELLIGENCE TEST SOPHISTICATION.

By P. E. VERNON.

I.—*Introduction.*
II.—*The Experiment.*
III.—*The Results.*
IV.—*Discussion.*
V.—*Conclusions.*

I.—Introduction.

Two personal experiences, which may have occurred to other psychologists, will introduce the topic. First, I am an extremely inefficient solver of cross-word puzzles. I generally rationalise my failures by saying that one has to be familiar with the ' language ' of cross-word puzzle authors, and that if I had time to learn this language, I would be more successful. Secondly, before giving group intelligence tests to my students, I habitually try them out myself, and am gratified at obtaining extremely high scores.

Now does not my explanation of the first of these experiences apply also to the second? May not an educational psychologist obtain very high intelligence test scores partly because he is familiar with the ' language ' in which group tests are usually set? Introspective consideration suggests that he does derive considerable advantages from his sophistication. He can grasp the essential points of the test instructions very quickly; he knows the kind of responses (e.g., underlining) that are required; and he avoids wasting time over difficult items. Quite as important perhaps is his subjective attitude. Instead of becoming wrought up, tense and easily muddled, as does the novice, he knows the advantage of a calm, systematic method of working. Doubtless other persons who are thoroughly familiar with group intelligence and educational tests will have thought for themselves of various other aids for increasing their test efficiency.

This sophistication is not quite the same as the practice effect which has often been shown to exist when testees take identical, or closely similar, group tests[1]. It is a matter of transfer, not so much of common identical elements, as of methods and principles. Whether it occurs to any marked extent among children, or adults of average intelligence, I cannot say. But the following investigation shows that it may have a considerable effect among adults of superior ability.

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[1] For example by Rodger, A. G.: *The Application of Six Group Intelligence Tests to the same Children, and the Effects of Practice.*—This *Journal*, Vol. VI, 1936, pp. 291-305.

II.—THE EXPERIMENT.

The experiment was undertaken as part of the ordinary class work of students at a teachers' Training College. It therefore served to illustrate a variety of points from lectures, including: (*a*) intelligence tests and testing procedure, (*b*) new-type educational tests, (*c*) scientific experimentation in education and the technique of experiments on transfer, (*d*) the statistics of percentiles, the mean, standard deviation, and standard error of the difference, (*e*) the project method.

Two tests were chosen to be as dissimilar as possible (so as to exclude simple practice effects). These were the verbal Group Test 33 of the National Institute of Industrial Psychology, and Stephenson's non-verbal G-Reference or Perceptual Test[1]. They are referred to below as the V and P tests respectively. One or other test was applied near the beginning of term when very few of the students knew anything at all about testing. Thereafter the students received three hours' lectures and two hours' practical work each week for four weeks, which dealt with tests, examinations, scientific method and statistics. The practical work included an experiment on the marking of English compositions[2], and demonstrations of Stanford-Binet and performance tests ; the students also did some of the Kwalwasser-Dykema music tests, the Nelson-Denny reading test, and either Schonell's adult spelling test or the 1937 Terman vocabulary test. At the end of the period they took the opposite group test. Naturally they were not informed as to the object of the experiment until this final stage was reached. It seemed best to tell them then, so as to request them to put as much (or as little) effort into this as into the initial test, to point out some of the respects in which the instruction they had received might help them to improve their performances, and so as to find out from them themselves whether any factors other than test sophistication were operating.

Half the students were sent out of college for four weeks' teaching practice in the middle of the instruction period ; hence four experimental groups had to be employed instead of the usual two. It was not possible to obtain control groups of the same initial ability as the experimental groups. Instead two groups of non-graduate students were given the same tests, six weeks apart[3]. In the interval their lectures and practical work dealt with an entirely different branch of educational psychology. The complete scheme of the experiment is given in Table I.

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[1] A simplification was introduced into the scoring of the third sub-test of this battery ; each correct item was assigned 3 instead of 6 marks. This reduces the maximum possible score for the whole battery to 93.

[2] Namely the excellent experiment given in L. WYNN JONES : *Introduction to the Theory and Practice of Psychology*, Chapter 20. (London, 1934.)

[3] I am indebted to my colleague, Mr. P. Kemp, for conducting this part of the investigation.

TABLE I.

THE SCHEME OF THE EXPERIMENT.

Group.		*Sex.*	*N.*	*Initial Test.*	*Interval.*	*Final Test.*
Experimental	A	Male ..	58	P	Four weeks' instruction in tests	V
	B	Female	64	V	Four weeks' instruction in tests	P
	C	Male ..	54	V	One week's instruction; four weeks' teaching practice; three weeks' instruction..	P
	D	Female	58	P	One week's instruction; four weeks' teaching practice; three weeks' instruction ..	V
Control	E	Female	33	P	Six weeks' College work; no instruction in tests.........................	V
	F	Female	27	V	Six weeks' College work; no instruction in tests	P

III.—THE RESULTS.

Table II lists the crude average scores on both tests. The average score on Test V when taken at the beginning of the experiment was 153·9, when taken at the end, 164·9. The corresponding figures for Test

TABLE II.

SHOWING AVERAGE SCORES ON THE TESTS.

	V-Test		*P-Test*	
Group.	*Initial.*	*Final.*	*Initial.*	*Final.*
A		165·5	37·7	
B	155·3			41·4
C	152·5			45·0
D		164·4	39·3	
E		142·4	38·2	
F	144·7			39·5

P were 38·5 and 43·2. The results of the control groups are somewhat irregular, but there is no evidence of a consistent improvement at their second testing.

These averages make no allowance for differences in ability of the various groups. The experimental groups were probably fairly close to one another; the control groups were also believed to be parallel, though inferior to the experimental groups. But a more accurate method of equating them is certainly needed. Moreover, the figures in Table II are untrustworthy because the distributions of scores on both tests were strongly skewed, positively in V, negatively in P. This means that the units in which the scores are expressed are not equivalent; e.g., the difference between V scores of 100 and 101 is much smaller than the difference between 180 and 181. Obviously, also the units in the two tests are non-comparable. Better comparisons could be made in terms of percentiles; but here too the units would be far from equal. The following method of treatment of the scores seemed the most appropriate.

The V scores of all the experimental groups were tabulated in a single distribution, and each score was turned into a percentile rank. These percentiles were then transposed into sigma units with a mean of 50, a range of 0 to 100, and a Standard Deviation of 20[1]. The same treatment was applied to the total distribution of P scores. The units were thus made approximately equivalent on both tests. Any student whose performances on the two tests were relatively the same should now obtain the same sigma score on both; and the difference between scores of, say, 20 and 21 should be equivalent to the difference between 90 and 91, etc. The scores of the control groups were similarly equated. The full results in terms of these units are given in Table III.

One would naturally expect many changes of relative score between the two tests, since these tests inter-correlate far from perfectly, namely +0·281 to +0·481 in different groups, average +0·356 ± ·038. But when (omitting changes of ±5 per cent or less) there are roughly three times as many increases as decreases of score in the experimental groups, the evidence for an improvement at the second testing becomes very strong. In the control groups, on the other hand, the increases and decreases nearly balance one another. Table III shows that the improvement in the average scores of the male groups, A and C, is statistically significant, i.e., more than three times its standard error; and that the improvement in the female groups, B and D, is more than twice its standard error. In

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[1] Note that this treatment assumes a range of scores of only $+2{\cdot}5\sigma$ to $-2{\cdot}5\sigma$. The top and bottom scores in the distribution were therefore slightly " compressed " to bring them within this range.

TABLE III.

SHOWING THE RESULTS OF THE EXPERIMENT IN EQUIVALENT UNITS.

Group.	*Mean Score on Initial Test.*	σ	σ_m	*Mean Score on Final Test.*	σ	σ_m	*Increase in Mean.*	$\sigma_{diff.}$
A	P 44·8	24·0	3·14	V 58·8	19·5	2·56	+13·9	4·05
B	V 43·2	18·7	2·33	P 51·1	16·8	2·11	+ 7·9	3·14
C	V 42·7	21·2	2·88	P 57·7	20·1	2·74	+15·0	3·98
D	P 47·2	18·8	2·46	V 55·4	16·4	2·15	+ 8·2	3·27
Combined Result of all Experimental Groups......	44·5	20·8	1·36	55·7	18·5	1·21	+11·3	1·82
E	P 48·7	23·5	4.09	V 47·8	20·4	3·54	– 0·9	5·41
F	V 51·8	21·6	4.23	P 51·4	18·7	3·67	– 0·4	5·60
Combined Result of Control Groups	50·2	22·6	2·92	49·6	19·6	2·54	– 0·6	3·87

the combined groups the increase of 11·3 per cent is fully six times its standard error. The slight decrease found in the control group averages is quite insignificant statistically. There is also a distinct decrease in the standard deviations of scores at the second testing, but this occurs also in the control groups. The differences of – 2·3 and – 3·0 in the experimental and control groups respectively have standard errors of 0·87 and 1·85. Thus the experimental group's decrease more nearly approaches statistical significance ; but not much weight can be attached to these results.

IV.—DISCUSSION.

Although the four experimental groups were clearly ***not*** equal in initial ability, yet their amounts of improvement are highly consistent, namely 14 to 15 per cent in both the male groups ($\sigma_{\text{diff.}}$ about 4·0), and 8 per cent in both the female groups ($\sigma_{\text{diff.}}$ about 3·2). The two control group results are also closely parallel. There is not, as might perhaps have been expected, a greater improvement on taking the V-test rather than the P-test at the end of the experiment. Indeed the results are so clear-cut that it seems justifiable to claim that the instruction to which the experimental groups were subjected, and the sophistication which they acquired, were truly responsible for the improvement ; and that the only other factor of any importance is the sex difference.

The subjective attitudes of testees and their strength of motivation are not supposed to affect their intelligence test scores[1] ; nevertheless I am inclined to put these forward as the most reasonable explanation of the sex difference. The women who took part in this experiment are almost all conscientious and earnest students who co-operated excellently throughout. The men include a few who are more brilliant than any woman, but also many who are far worse students. They tend to be less adjusted to the prospect of teaching, and more resentful of the restrictions imposed by their training. Some seem almost incapable of acquiring a scientific attitude to, or of comprehending the psychological approach to, human problems ; and to be highly suspicious of their lecturers' attempts to measure their abilities, or to subject them to introspective experiments. Since the dispersion of scores was greater in the male than the female experimental groups, the men had greater chances of improvement ; and it seems quite probable that a number of them were slipshod in their approach to the initial test, but much more efficient when doing the final test owing to the additional motivation.

Discussion failed to elicit other reasons for the increases in scores. Some students mentioned fatigue at the beginning of term, on account of recent university examinations. But this would apply only to a small proportion who were distributed through all four experimental groups ; and its effects on test performance are dubious. External disturbing noises during the testing could not be wholly eliminated, but they varied little from one session to another.

V.—CONCLUSIONS.

Even if we discount part of the men's improvement as spurious, we are still left with a total effect amounting to about half a standard deviation of the scores. If the same effect occurred in persons of average intelligence it would correspond to a rise of at least 8 points in intelligence quotient. We must not, of course, assume that the results of this study would apply equally to other groups of other levels of intelligence, since the capacity for test-sophistication doubtless depends itself on intelligence. We can claim, however, that the results indicate alarming possibilities of derangement of the norms for superior-adult tests. They suggest that at least two sets of norms should be published with every intelligence or new-type educational test, one set for novices, another for sophisticated testees.

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[1] For a discussion of the arguments for and against this viewpoint see VERNON, P. E.: "The Stanford-Binet Test as a Psychometric Method."—*Character and Personality*, Vol. VI, 1937, pp. 99-113.

The results raise a number of fresh problems which require further investigation. Foremost of these is the extent of the sophistication effect in groups of average ability. My own data throw no light upon the relation of the effect to intelligence level since, owing to the method of scoring, students with the lowest scores inevitably showed the greatest improvement, those with highest scores the least. Secondly, it is desirable to study how far the transfer must be conscious, and how far it is acquired by persons who, not being students of psychology or education, do not deliberately study testing principles and the ' language ' of tests. Lastly, this investigation may have failed to reveal the maximum extent of the effect. For the students received merely twenty hours of instruction, spread over four to eight weeks, only a small proportion of which had any direct bearing on test ' language.' The professional psychologist's advantage may be very much greater than that demonstrated here.

RÉSUMÉ.

L'INFLUENCE DE L'EXERCICE DANS LES TESTS D'INTELLIGENCE.

Quatre groupes d'étudiants d'École Normale expérimentaux, et deux de contrôle, se soumirent à deux tests d'intelligence groupés, l'un verbal, l'autre non-verbal, à un intervalle de 4-8 semaines. Dans l'intervalle l'on donna aux groupes expérimentaux une vingtaine d'heures d'enseignement dans les principes de la psychométrie et dans le travail pratique des tests. Lorsqu'on transpasa en unités équivalentes les notes des tests, l'on trouva un gain de 14 per cent. chez les hommes et de 8 per cent. chez les femmes, ce qui correspond à la moitié au moins de l'écart étalon des notes. L'amélioration fut égale dans les deux tests, et elle a une importance statistique. Nulle amélioration ne se produisit chez les groupes de contrôle.

L'on attribue ce résultat à l'exercice dans les tests obtenir par les groupes expérimentaux. Donc les standards des tests chez des adultes supérieurs dépendent probablement jusqu' à un certain point du degré d'exercice ou de familiarité avex les tests en général.

Il est nécessaire de pousser plus loin l'étude de l'étendue de cet effet de transférement, surtout chez des groupes à d'autres niveaux d'aptitudes.

ZUSAMMENFASSUNG.

VERTRAUTHEIT MIT INTELLIGENZPRUFUNGEN.

Vier experimentelle und zwei Kontrollgruppen von Studenten an Lehrerbildungsanstalten unterzogen sich zwei Intelligenztests, einem Wort-und einem Nicht-Worttest mit Pausen von 4-8 Wochen. In der Zwischenzeit erhielten die experimentellen Gruppen etwa zwanzig Stunden Uterricht in den Grundsätzen des erzieherischen Messverfahrens und der Testpraxis. Als die Resultate der Prüfungen in gleichwertige Einheiten verwandelt wurden, entdeckte man im zweiten Test einen durchschnittlichen Gewinn von 14 v. H. bei den Männern, 8 v. H. bei den Frauen, welches mindestens einer halben Standardabweichung der Resultate entsprach. Die Besserung war in beiden Tests dieselbe, und das ist statistisch bemerkenswert. Bei den Kontrollgruppen kam keine Besserung vor.

Dieses Ergebnis ist der Vertrautheit mit dem Testverfahren, die von den experimentellen Gruppen erworben ist, zuzuschreiben. Daher hängen die Testnormen bei den intelligenteren Erwachsenen wahrscheinlich einigermassen von deren Grad von Vertrautheit mit Tests im allgemeinen ab. Man muss die Ausdehnung dieser Übertragungswirkung, insbesondere bei Gruppen von anderem Fähigkeitsniveau, weiter untersuchen.

METHODS OF CLASSIFYING FIRST YEAR SECONDARY SCHOOL PUPILS.[1]

BY DAVID DONALD.

I.—*The problem.*
II.—*The data.*
III.—*Comparison of different criteria of pupils' ability.*
IV.—*Consideration of the actual classification.*
V.—*Other possible classifications.*
VI.—*Conclusions.*

I.—THE PROBLEM.

IN the school under consideration, 150 to 180 boys are admitted annually to the first year of the secondary department. It is found inconvenient, for various reasons, to make all pupils who propose to enter try the same entrance examination. Some of these enter the school with scholarships gained in an examination in English, arithmetic, history and geography. Others are admitted from the primary department of the same school; while the remaining places are filled up after an entrance examination in English (essay and interpretation) and arithmetic (including mental arithmetic).

All the entrants are divided into five classes, A, B, C, D and E. Owing to differences in the two examinations a large number of unsatisfactory placings result. Moreover, research has shown that a classification based on primary school work alone is not very reliable. Thus in an investigation on the reliability of secondary school entrance examinations,[2] it was found that, in five centres out of eight examined, the correlation between the order of merit and that in the fourth and fifth year of the secondary course was practically nil. This lack of correlation is apparent also when the entrance examination results are compared with those of first year examinations. There is some evidence which tends to show that the inclusion of an intelligence test and special care in the setting of the entrance examination papers lead to a slight improvement in the correlation, but the best correlation coefficient for any of the centres investigated was less than 0·5.

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[1] The writer desires to express his thanks to Mr. I. Graham Andrew, M.A., Head Master of Robert Gordon's College, Aberdeen, for granting facilities for carrying out this investigation.

[2] See *The Reliability of Examinations*, by C. W. VALENTINE. (London, 1932), Chaps. III–V.

A number of further investigations agree in showing that the combining of intelligence tests with entrance examinations for secondary schools gives somewhat better correlations with the pupils' subsequent attainments than either taken alone.[1] A. Donald Amos and J. W. Collier agree that in the prediction of secondary school achievement, a combination of an entrance examination (English and arithmetic) and an intelligence test gives the best results. A similar conclusion is arrived at by A. G. Hughes in an investigation carried out in some London schools; while Godfrey H. Thomson, reporting on another similar experiment, gives correlations with secondary school achievement for the various parts of an entrance examination, including English, arithmetic and intelligence tests. The highest correlation found is again between the secondary school achievement and a combination of all three tests. In none of these investigations, however, is the correlation between any part or combination of parts of the entrance test and subsequent performance as high as 0·6.

On this evidence the usual entrance examination does not seem to promise a very reliable basis for classification of pupils in the secondary school. An added difficulty is that in the school under review, as mentioned above, it is not found convenient to set the same entrance examination to all pupils.

It is important that the E class should be selected with special care, as it is a non-Latin class, and want of Latin is a serious disability for boys wishing to enter the local university.

In view of these circumstances, it was decided, as an experiment, to try a re-classification of the first-year pupils a month after the opening of the school session. This helps to obviate the difficulty mentioned by C. W. Valentine,[2] that one of the causes of the low correlation between entrance examination performance and subsequent performance is the abrupt change in the nature of the work ; but of course it cannot remedy possible injustice in the case of those who have already been excluded by the entrance examination.

During this first month all first-year pupils took the same curriculum. The probation period had to be as short as possible, as the pupils, being still in doubt whether they were to take Latin or technical subjects, were not required to provide themselves with Latin text-books. Owing to this, the teachers of Latin were put to considerable inconvenience.

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[1] See *Examination and Intelligence Test Forecasts of School Achievement*, by A. DONALD AMOS (this JOURNAL, Feb., 1931) ; *The Predictive Value of Intelligence Tests for Secondary Education*, by J. W. COLLIER (this JOURNAL, Feb., 1933) ; *Discrepancies between Results of Intelligence Tests and Entrance Examinations to Secondary Schools*, by A. G. HUGHES (this JOURNAL, Nov., 1934) ; *Value of Intelligence Tests in an Examination for Selecting Pupils for Secondary Education*, by GODFREY H. THOMSON (this JOURNAL, June, 1936).

[2] *Op. cit.*, p. 79.

The present essay is an attempt to assess the value of this early test in predicting future performance in the school.

II.—THE DATA.

At the end of one month all first-year pupils took an examination in English, Mathematics, Latin and French, a total of fifty marks being allowed for each subject. In addition Richardson's Simplex Group Intelligence Scale was set. It will be understood that any mention of Intelligence Quotients in this essay refers to those derived from this scale. Later, in the month of December, Classes A, B, C and D took an examination in Mathematics, Latin, French and Science ; and later still, in the month of May, another examination in Mathematics, Latin, French, Science and English. The E class, following a more restricted curriculum, was not in a position to take the same examination as the others. These examinations included several subjects ; were spread over two days each ; and took place at two totally different times of the year. There is thus a probability that some chance influences would be cancelled out. The various classes, of course, were taught by different teachers, but where more than one teacher was concerned in the marking of an examination, each marked the same section of that examination for all classes so as to ensure uniformity. The examinations were used as a measure of the actual achievements of the pupils during the year. Similar examinations were set in the second year. The following information was thus available :

(1) Intelligence quotients and September attainments marks for 149 boys, one month after entrance.
(2) First year December and May attainments marks for 114 of these.
(3) Second year December and May attainments marks for 105 of these.

III.—COMPARISON OF DIFFERENT CRITERIA OF PUPILS' ABILITY.

It was foreseen that pupils who had previously attended a secondary or intermediate school would have a decided advantage in the September examination, owing to previous experience of the work. This is confirmed by the following calculation regarding the 31 pupils in this category. The average I.Q. for the whole first year was 117 (range, 90 to 147), and for these 31 boys it was 116 (range, 90 to 146), indicating that they were practically an average sample, and yet they had an average mark of 133 (range, 74 to 180), compared with 122 (range, 39 to 182), for the whole group. It would appear necessary, therefore, to give special consideration to these pupils in the reclassification to avoid putting them in too high a class.

Correlation coefficients derived from Spearman's formula for rank coefficient of correlation were found as follows (classes A, B, C and D combined):

(1) Between I.Q. and Sept. exam. .... $\rho = \cdot 36 \pm \cdot 055$
(2) ,, ,, ,, Dec. exam., first year ...... $\rho = \cdot 49 \pm \cdot 049$
(3) ,, ,, ,, May exam., first year .... $\rho = \cdot 56 \pm \cdot 045$
(4) ,, ,, ,, Dec. exam., second year .... $\rho = \cdot 49 \pm \cdot 052$
(5) ,, ,, ,, May exam., second year .... $\rho = \cdot 52 \pm \cdot 049$

These coefficients would probably have been higher if the E class could have been included. For example, between I.Q. and September examination (classes A, B, C, D and E combined), $\rho = \cdot 54$. This is explained by the fact that it was comparatively easy to pick out the A class, boys with I.Q. and examination mark both high, and the E class, boys with I.Q. and examination mark both low. The omission of the E class means the omission of about 25 boys whose I.Q. and examination mark agreed closely. It is not surprising, therefore, that this has the effect of reducing the correlation coefficient.

Of the 57 boys whose rank in I.Q. and September examination differed most, 46 had moved nearer the I.Q. rank in May. Taking the whole 57 the average differences in rank were:

(1) Between I.Q. and September mark .... 47·4
(2) ,, ,, ,, December mark .... 37·9
(3) ,, ,, ,, May mark .... 32·7

From these it appears that the I.Q., as estimated by these particular tests, becomes rather more important in the course of the first year, but that by itself it is not a very reliable guide to future achievement in the secondary school.

The September marks were next correlated with those for the other four examinations with the following results:

(1) Between Sept. marks and Dec. marks, 1st year $\rho = \cdot 73 \pm \cdot 030$
(2) ,, ,, ,, ,, May marks, 1st year $\rho = \cdot 67 \pm \cdot 035$
(3) ,, ,, ,, ,, Dec. marks, 2nd year $\rho = \cdot 72 \pm \cdot 033$
(4) ,, ,, ,, ,, May marks, 2nd year $\rho = \cdot 72 \pm \cdot 033$

These figures are comparable with the correlation of 0·69 found by C. W. Valentine between first and fourth year secondary school work. Taken along with the low correlation generally found between entrance examination and secondary school achievement, they support his view that specific abilities are required in a secondary school course, even at the very beginning, which are not tested by the usual entrance examination.[1]

The September marks were combined with the I.Q's by simply adding the marks (possible 200) to the I.Q.'s. This method of combination gives the examination mark (standard deviation, 26·9 ; range, 78 to 182) about two and a half times the weight of the I.Q. (standard deviation, 10·4 ; range, 90 to 147). Comparisons of these placings with the December and May examinations for both years yields the following values :

(1) Between combined marks and Dec. marks, 1st year $\rho = \cdot 76 \pm \cdot 027$
(2) ,, ,, ,, ,, May marks, 1st year $\rho = \cdot 78 \pm \cdot 025$
(3) ,, ,, ,, ,, Dec. marks, 2nd year $\rho = \cdot 75 \pm \cdot 030$
(4) ,, ,, ,, ,, May marks, 2nd year $\rho = \cdot 76 \pm \cdot 029$

In order to estimate the worth of these correlations, the coefficient between the December and May examinations (where a high degree of correlation would be expected) was then calculated. It was found to be $\rho = \cdot 82 \pm \cdot 021$.

IV.—CONSIDERATION OF THE ACTUAL CLASSIFICATION.

When the I.Q's and the September marks had been obtained, the head master met the heads of departments and the form masters for the purpose of reclassifying the boys into classes A, B, C, D and E. In the last class technical subjects were to be substituted for Latin, while in C pupils had the choice of either. Boys who chose technical subjects were, therefore, in C or E, and thus C contained boys who might otherwise have been in A, B or D. In estimating the success of the classification, 13 boys from C who took technical subjects have therefore been omitted.

Where the I.Q. and examination mark agreed there was, of course, no difficulty. The other cases were considered individually so that the form master might give his opinion.

If the average percentage in the December and May examinations is taken as a measure of each boy's achievement, Table I shows the success attained in classifying the pupils.

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[1] *Op. cit.*, pp. 79 and 84.

TABLE I.

SHOWING THE DISTRIBUTION OF THE AVERAGE DECEMBER AND MAY PERCENTAGES FOR THE FIRST YEAR IN THE VARIOUS CLASSES.

December and May average percentages.	*A.*	*B.*	*C.*	*D.*
85—89	5			
80—84	7	1		
75—79	7	2		
70—74	5	2	1	
65—69	1	3	2	1
60—64	2	11	4	2
55—59		9	5	3
50—54		1	1	3
45—49		2		6
40—44				5
35—39				5
30—34			1	2
25—29				2
TOTAL	27	31	14	29

It should be noted that a boy would not necessarily have made the same mark if he had been put into another class. For example, the boy who made 80 per cent in B might not have done so well if he had been in A, a class which probably worked at a slightly faster rate. It must be remembered, too, that the classes were taught by different teachers. Of the three lowest boys in A, the highest was just on the borderline between A and B both in I.Q. and September marks. Of the others, one had a very low I.Q. for A, and the other, with a moderate I.Q. (say about B standard), had been at an intermediate school and had therefore an advantage in the September examination. Of the five top boys in B, four had a high I.Q. and a high September examination mark and must just have missed getting into A. All five were promoted to A in the second year and justified their promotion. The boy at the foot of C had a comparatively high September examination mark, probably owing to attendance in E the year before, but had an I.Q. of 98. Of the three top boys in D, two had very high I.Q.'s for the D class.

Experience in the school has shown that the reclassification at the end of September has had the effect of reducing considerably the number of misfits. In the light of the December and May examinations and the teachers' class examinations in the first year, it was considered advisable to make the following changes at the end of the year :

(1) From A ; two boys transferred to B and two to C (the latter necessitated by a change to technical subjects).
(2) From B ; six boys transferred to A and two to C.
(3) From C ; three boys transferred to B and two to D.
(4) From D ; three boys transferred to C.
(5) From E ; one boy transferred to C.

In no case was the change more than one class, except where the choosing of technical subjects necessitated a change to C.

V.—OTHER POSSIBLE CLASSIFICATIONS.

Since the object was to discover the best use that could be made of the data available at the time of the reclassification, various other methods were tried of classifying the 101 boys into A, B, C and D in the same proportions as in the last section. Similar tables were constructed for these and the standard deviations from the averages in each class were found, in order to show how closely the classes were grouped together. These methods of classification in order of merit were :

(1) Classification by adding *total* September mark (possible 200) to I.Q.
(2) ,, as actually carried out.
(3) ,, by adding September *percentage* to I.Q.
(4) ,, by September mark alone.
(5) ,, by averaging rank in I.Q. and in September examination.
(6) ,, by I.Q. alone.

The classification as actually carried out has a certain incidental advantage over the others, because when boys are put in the same class the teachers try to keep them working at the same stage as far as possible.

The classification of the second year was based on the results of the first year. After the adjustments detailed in Section IV, the grouping at the May examination in the second year is shown in Table II (the C pupils taking technical subjects being omitted as before).

TABLE II.

SHOWING THE DISTRIBUTION OF THE MAY EXAMINATION PERCENTAGES FOR THE SECOND YEAR IN THE VARIOUS CLASSES.

May percentage, second year.	*A.*	*B.*	*C.*	*D.*
90—94..............	1			
85—89..............	5			
80—84..............	6			
75—79..............	9	1		
70—74..............	4	1		
65—69..............	3	2	1	
60—64..............	3	8	3	2
55—59..............		10	5	5
50—54..............		4	1	5
45—49..............		4	1	4
40—44..............		1	3	4
35—39..............				6
30—34..............				2
TOTAL	31	31	14	28

VI.—CONCLUSIONS.

(*a*) In classifying pupils in the first year of the secondary course, it is important to make some allowance for pupils who have had previous experience of secondary school work. In many cases the examination mark in September is higher than is realised in subsequent achievement. If the boys are placed according to their actual performance in September, some of them will have to be moved to a lower class later on, and this has a discouraging effect on them.

(*b*) The correlation coefficients between I.Q's, as determined by Richardson's Simplex Group Intelligence Scale, and the different examinations, are fairly steady in the neighbourhood of 0·5, except that with the September examination, which is lower. This indicates that the I.Q. by itself is not a reliable guide in classifying the pupils. The investigations mentioned in Section I show that 0·5 is about the highest correlation likely to be found here.

(*c*) The correlation coefficients between September examination marks and those of subsequent examinations are fairly high (about 0·72), which is to be expected, as these examinations are set on the same kind of work.

(*d*) If the September examination marks are combined with the I.Q's, giving the former a good deal more weight than the latter, the correlation coefficients between this combined mark and subsequent examinations are slightly but steadily higher (about 0·76) than those mentioned in (*c*). They compare favourably with the correlation coefficient between the December and May examinations in the first year (0·82), where a high degree of correlation would be expected. The intelligence test is also useful in inducing teachers to search for causes that explain why pupils with high I.Q's are not doing satisfactory work in school.

(*e*) The classification carried out after the September examination was based on examination marks and I.Q.'s, form masters giving their opinion in the cases where the examination mark and I.Q. showed a discrepancy. If the December and May examinations are taken as a test of achievement in the first year, there is no serious overlapping between classes A and B, or between classes C and D.

(*f*) A comparison of several different bases of classification shows that a classification based on a combined September examination mark and I.Q. (giving the former about two and a half times the weight of the latter) leads to the closest grouping in the four classes.

The marked improvement in classification in the school has led to the adoption of the September examination and intelligence test as the regular basis of classification in the first year. A combined mark, the two parts weighted approximately as in (*f*), is adopted as the main predictive criterion of ability.

RÉSUMÉ.

DES MÉTHODES DE CLASSER LES ÉLEVÈS DE PREMIÈRE ANNÉE DANS UNE ÉCOLE SECONDAIRE.

A cause de la difficulté d'établir un seul examen d'entrée pour les élèves qui commencent leurs études secondaires, et du manque de validité des résultats de l'école primaire, comme pronostic de l'accomplissement futur dans l'école secondaire, l'on tenta dans une école l'expérience de reclasser les élèves après un examen, basé sur le travail du premier mois, et un test d'intelligence. On repartit alors les élèves dans cinq classes, A, B, C, D et E. Des examens passés en décembre et en mai

de chacune des deux premières annés furent adoptés comme la mesure de l'accomplissement des garçons dans les classes A, B, C et D (E étant omise comme ayant un programme plus limité). Le calcue des coefficients de corrélation, et la comparaison des méthodes diverses de classement, donnèrent les résultats suivants : (a) Il faut se méfier en classant des élèves ayant déjà quelque expérience du travail de l'école secondaire, puisque leurs notes peuvent être trop élevées. (b) Le I.Q. tel que l'établit le " Simplex Group Intelligence Scale " de Richardson n'est pas en lui-même un guide valable pour le classement des élèves. (c) Les notes des examens de la fin du premier mois montrent une corrélation assez élevée (environ 0.72) avec les examens subséquents de la première et de la seconde année. (d) Une combinaison des I.Q.'s avec les notes du premier examen (en ajoutant à celles-ci une augmentation compensatrice) donnent une corrélation encore plus élevée (environ 0.76) avec des examens subséquents. (e) Une comparaison des bases variérs du classement indique que la note combinée donne le groupement le plus homogène dans les diverses classes. Dans cette école l'on adopté la note combinée comme la base reconnue du classement dans la première année.

ZUSAMMENFASSUNG.

EINTEILUNGSMETHODEN BEI SCHÜLERN DER ERSTEN KLASSE AN EINER HÖHEREN SCHULE.

Wegen Schwierigkeiten bei der Einführung einer allgemeinen Aufnahmeprüfung für Knaben, die auf eine höhere Schule wollen, und wegen der Unzuverlässigkeit der Ergebnisse in der Volksschule im Vorhersagen künftiger Leistung in einer höheren Schule, versuchte man, die Schüler nach einer Prüfung, die sich über den Unterrichtsstoff des ersten Monats erstreckte, und nach einem Intelligenztest einzuordnen. Man teilte dann die Schüler in fünf Begriffsklassen A, B, C, D und E. Die Dezember- und Maiprüfungen in jedem der ersten zwei Jahre der höheren Schule wurden der Masstab für die Leistungen der Knaben in A, B, C, und D genommen : ausgelassen wurde E wegen eines beschränkteren Lehrplans. Als man die Korrelationen und die verschiedenen Einteilungsmethoden verglich, ergab sich Folgendes : (a) Man soll sich bei der Beurteilung von Knaben in acht nehmen, die schon Erfahrungen im Unterricht der höheren Schule haben, da am Ende des ersten Monats ihre Zensuren zu gut sein können. (b) Der von Richardsons " Simplex " Gruppenintelligenzskala bestimmte Intelligenzquotient ist an sich kein sehr zuverlässiger Masstab bei der Einordnung der Schüler. (c) Die Septemberzensuren haben eine ziemlich hohe Korrelation (annähernd 0,72) mit späteren Prüfungen im ersten und zweiten Jahr. (d) Eine Verbindung der Intelligenzquotienten und der Zensuren in der Septemberprüfung (wobei man diesen grösseren Wert beimass als jenen) korreliert noch höher (circa 0.76) mit späteren Prüfungen. (e) Ein Vergleich der verschiedenen Grundlagen der Einteilung weist daraufhin, dass die kombinierte Zensur die genaueste Gruppierung in den verschiedenen Begriffsklassen ergibt. Man hat die kombinierte Zensur als eine zuverlässige Basis der Beurteilung im ersten Jahr in der Schule aufgenommen.

MAXIMISING THE SPECIFIC FACTORS IN THE ANALYSIS OF ABILITY.

By GODFREY H. THOMSON

I.—*Introduction.*
II.—*Maximising the specifics.*
III.—*The nature of specifics.*
IV.—*The purpose of factorial analysis.*
V.—*Conclusions.*

I.—INTRODUCTION.

THE publication in 1935 of Professor Thurstone's admirably clear book, *The Vectors of Mind*, directed attention to the important part which specific factors play in his system, as previously in Professor Spearman's Two-factor theorem. I wish in the present article to point out that both systems *maximise the specifics*, a proceeding which seems to me to be accompanied by a number of disadvantages. By maximising the specifics I mean arriving at an analysis where the variance of the specific factors is greater than in any other analysis with rational loadings. This is the price paid in Spearman's and Thurstone's systems for minimising the number of common factors.

I had already written out this article in 1935 when I was held up by discovering, as I thought, some cases which were exceptions to the above principle, that minimising the number of common factors maximises the variance of the specifics. I easily satisfied myself empirically that such cases—they were associated with multifactor analogues to the "Heywood" case in a hierarchy—would not occur in practice, but I was unwilling to publish until this point had been theoretically cleared up. This has now in large measure been done by my assistant, Dr. Walter Ledermann, and I feel confident that exceptions, though mathematically possible, are in practice impossible.

II.—MAXIMISING THE SPECIFICS.

Thurstone's method consists theoretically, apart from the approximations made necessary by the presence of errors, in discovering that set of quantities h_1^2, h_2^2, h_3^2, . . . which, when placed in the diagonal cells of a correlational matrix thus,

$$\begin{array}{cccccc}
h_1^2 & r_{12} & r_{13} & \cdot & \cdot & \cdot \\
r_{12} & h_2^2 & r_{23} & \cdot & \cdot & \cdot \\
r_{13} & r_{23} & h_3^2 & \cdot & \cdot & \cdot \\
\cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\
\cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\
\cdot & \cdot & \cdot & \cdot & \cdot & \cdot
\end{array}$$

cause the rank of the matrix, that is, the order of its largest non-vanishing minor, to be as small a number as possible. The tests to which the correlations refer can then be described by that same small number of common factors, plus however n specific factors, one for each test. The procedure has made the number of common factors as small as possible, it is true ; *but at the expense of making the n specific factors as big as possible.* Except for the "trivial" cases mentioned above, if numbers smaller in total than the quantities h_i^2 (which Thurstone calls the communalities) are placed in the diagonal cells, the analysis fails unless factors with a loading of $\sqrt{-1}$ are admitted (see page 103, *The Vectors of Mind*). The quantities h_i^2 are as small as they can be without this happening. And quantities $(1 - h_i^2)$ give the variances due to specific factors, which (since $\Sigma\, h_i^2$ has been minimised) clearly have been maximised.

The extent to which the insertion of arbitrary values in the diagonal cells can lower the rank of the matrix is limited by the minors which are just of small enough dimensions to avoid the diagonal. These minors have values, as determinants, which are settled by the experimental correlation coefficients, and unless they are zero or sufficiently near to zero the rank of the matrix cannot be further depressed by any manipulation whatever of the diagonal cells.

Spearman's earlier Two-factor analysis was a special case of Thurstone's later development. In a Spearman matrix, the minors just referred to are, with all their sub-minors down to the tetrads, sufficiently near to zero (for the matrix is made by rejecting tests which break this law) ; and therefore communalities can be found which, making the diagonal tetrads also zero[1], reduce the rank of the resulting matrix to *one*.

One general factor therefore suffices, but the specifics which accompany it are larger than would occur on any alternative analysis of those correlations. This can be vividly shown by the following crude diagrams, in which each oval represents the variance of a test, and the numbers stand for the variances of the cells in which they are found. Diagram I represents a Two-factor situation. Only the general cell and the four specifics have contents. If we reduce the variance of each test to unity, the specifics form

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[1] Cf. GODFREY H. THOMSON, "Hotelling's Method modified to give Spearman's G."—*Journ. of Educ. Psychol.*, May, 1934, pp. 367-8.

$$\tfrac{1}{6}+\tfrac{1}{3}+\tfrac{1}{2}+\tfrac{2}{3}=1\tfrac{2}{3}$$

out of the total variance of 4, or 41·7 per cent. Innumerable other diagrams can be drawn giving the same correlations as the above, but in all others the part played by specifics is less important. For example in Diagram II the specifics contribute only

$$\tfrac{1}{9}+\tfrac{1}{18}+\tfrac{1}{27}+\tfrac{1}{36}=\tfrac{25}{108}$$

out of the total variance of 4, or 5·8 per cent. These two diagrams give identically the same correlations, namely the following each divided by 6 :

	1	2	3	4
1		$\sqrt{20}$	$\sqrt{15}$	$\sqrt{10}$
2	$\sqrt{20}$		$\sqrt{12}$	$\sqrt{8}$
3	$\sqrt{15}$	$\sqrt{12}$		$\sqrt{6}$
4	$\sqrt{10}$	$\sqrt{8}$	$\sqrt{6}$	

For example from the first diagram we have

$$r_{23}=\frac{30}{\sqrt{(45\times 60)}}=\frac{\sqrt{12}}{6}=\cdot 577$$

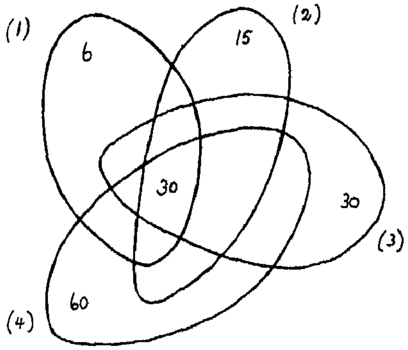
and from the second diagram

$$r_{23}=\frac{20+10+4+2}{\sqrt{(72\times 54)}}=\frac{\sqrt{12}}{6}=\cdot 577$$

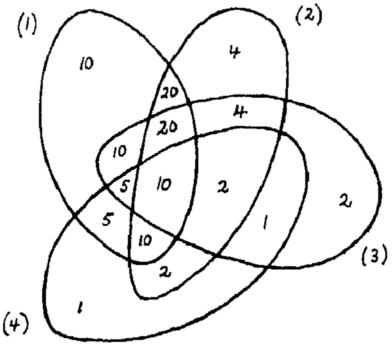
III.—THE NATURE OF SPECIFICS.

So far I have been using the term specific to include everything that contributes to what Thurstone calls the uniqueness of the test. In several places in *The Vectors of Mind* Thurstone emphasises his point that every test is sure to have some unique variance. This uniqueness he analyses (p. 78 and p. 130) into three parts, " (*a*) the variable chance errors in the scores of the N individuals, (*b*) the specific factors or abilities which are almost certain to be involved in each test of any finite battery, and (*c*) the sampling errors in the coefficients of correlation. All three of these sources of variance " he continues, " are unique for each test ; and hence they must be accounted for by unique factors, i.e., factors which are, by definition, not common factors."

Now Thurstone is, I conceive, in error when he says that items (*a*) and (*c*) of the classification are unique for each test. The sampling errors of category (*c*) certainly are not. Sampling errors, that is errors due to the fact that we have tested only a sample of the population, are correlated with one another. The errors in correlation coefficients due to sampling are themselves correlated, and sampling errors superimpose on any preexisting matrix of correlations an additional structure which tends to be hierarchical in nature or at least of a low rank[1]. The part of the test variances due to sampling errors will not be represented by unique factors, but by a system of wider factors. Indeed the matter is more complex than this and requires a paper to itself.



I.



II.

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[1] *See* GODFREY H. THOMSON, "On the Cause of Hierarchical Order."—*Proc. Roy. Soc. London*, 1919, A, Vol. 95, pp. 405-7.

The " variable chance errors " listed in category (*a*) *may* be unique. But they need not be unique, and often they certainly will not, but will run through several tests. Suppose that when I come to be tested I have a slight toothache, or I have brought the wrong spectacles, or I have had some good news, or I dislike the look of the candidate on my left. These things are I suppose variable chance errors, but they may well disturb *all* the tests I do at that sitting.

The unreliability of a test is generally held to be due to variable chance errors. But unreliability is due to factors which are unique, not to the test, but *to the occasion*. Tests a and b performed to-day, and repeated as tests a^1 and b^1 to-morrow, may have reliabilities less than unity. Yet the chance errors of to-day may link a and b, and the chance errors of to-morrow may link a^1 and b^1.

There remains the true specific of each test. It does not seem unreasonable to suppose that such exist. I can especially see that I may at first *lack* a specific ability for a certain test, but may acquire it if I am given a few practice periods. I can drive a motor car. But when I enter a strange one I have to acquire its specific tricks. In this sense at least I can appreciate the possibility of specific factors existing. But I fail to see why I should adopt a technique which begins by saying, " let all specific factors be sssumed to be as large as possible."

It should be noted, however, that although in any battery of tests which is being analysed the specifics are maximised, yet as more and more tests are considered, it is hoped by Thurstone that the specifics will disappear (in spite of the maximising technique). This expectation is stated by Professor Thurstone on his page 63 : "An object of psychological inquiry is to isolate an increasing number of abilities until the specific variance of each important test shall be reduced to a minimum. It is not likely that any single test will be completely described in terms of the factors which it has in common with those of one battery. In order to isolate all of the abilities that are called for by a test, it will probably be necessary to insert it in several test batteries in succession. The specific variance of a test should be regarded as a challenge : it is that part of the total variance of a test which is unique in a particular battery, and hence its factorial composition is unknown. In order to test a hypothesis concerning the abilities which are involved in the specific variance of a test, the test should be combined with others which involve the hypothetical abilities. If the specific variance is reduced, the hypothesis is sustained."

Now, although I wish Thurstone the best of luck in the attempt, it seems to me most unlikely that this will happen if at each analysis the principle of minimising the rank (and thereby maximising the specifics) is followed. Of course, if the analysis of a test in one battery is to be held as fixed, as regards common factors, when it is analysed in another battery, and unchanged except for the splitting up of its former specific, then Thurstone's expectation may come true. But that will mean a complete departure from the principle of minimal rank, and will involve the arbitrary acceptance of certain analyses as sacrosanct, and the forcing of other analyses to conform with them, either by simply adopting former loadings for certain tests, or by a process of purification such as is used in the hierarchical case.

IV.—THE PURPOSE OF FACTORIAL ANALYSIS.

What decision we come to on this matter of maximising the specifics will largely depend on what we conceive to be the purpose of factorial analysis. It is to be observed that a Thurstone analysis, with the minimal number of common factors and with maximised specific variance, is capable of reproducing the correlation coefficients *exactly* by means of these few common factors, and in the case of an artificial example will actually do so : while in the case of an example including errors it will do so just as well as any other method. If this is our sole purpose, therefore, the Thurstone analysis is best, since it uses fewest factors.

But the few common factors of a Thurstone analysis do not enable us to reproduce the original test scores from which we began, they do not enable us to describe the powers of our population of persons very well, for the method has caused the specific abilities of these persons to have their maximum importance. With the same number of Hotelling's " principal components " we could arrive at a closer approximation to the original scores. The reader may reply that we do not want factors for the purpose of reproducing the original scores, for we have the original scores themselves. But the same can be said about reproducing the original correlations, which we also have. In both cases what we really mean is that the factors give a concise and convenient shorthand description. With few factors—the common factors only—the Thurstone method gives a good description of the correlations, but a bad one of the scores. With the same number of factors as Thurstone has of common factors, the Hotelling method can give a better description of the scores, though a worse one (at least in theory) of the correlations. What then do we want either the correlations or the scores for ? One practical use they are put to, or it is hoped they may be put to, is in vocational advice. Has the maximising of the specifics given a worse set of factors for this purpose ?

At first sight, at least, one would be inclined to expect this, for by throwing away all information about as large as possible a proportion of each man's score on each test (keeping only the minimum necessary to explain the correlations) the Spearman-Thurstone methods have surely handicapped themselves. I say " throwing away the information," for it is not intended, or at least it is not generally intended, to estimate a man's specifics. That would involve estimating more factors than there are tests, and the " parsimony " argument in favour of the Thurstone method would fall to the ground if that were done. These methods cannot *both* claim to be good because they use few factors, *and* nevertheless use all the specifics.

If we are going to test a person for the purpose of estimating how he is likely to succeed in a certain vocation (which may be the " vocation " of being a secondary school pupil) we must, if we can, give the tests we are going to use to a number of persons who already have succeeded or failed in various degrees in that occupation. We can then calculate the correlation between each test and success in the occupation, and also the intercorrelations of the tests with one another, in this sample of persons. Armed with this knowledge, we then give the same tests to the candidate. From his scores in them, and the above correlations, we can estimate his success in the occupation by a regression equation, without using any factors at all. *Nor can any use of factors improve on this estimate*, if the above procedure is practicable.[1]

It is only when the above straightforward process is for some reason impossible that factors of any sort can be of use. We must have given some tests or other to the persons already engaged in the occupation, and some tests or other to the candidate, but it may be that the two sets of tests are not identical. We may then perhaps proceed indirectly, saying that the one set of tests shows that persons with such and such an outfit of factors succeed in the occupation, and that the other set of tests shows to what extent our candidate possesses these requisite factors ; and thus judge his fitness at second hand, as it were, using the factors as middlemen, or as a kind of coinage or tokens to carry us over from the one set of tests to the other. This procedure, however, it must be emphasised, cannot possibly be any better than the direct method, and will usually be worse. Which kind of factors will facilitate it most ?

As they stand, Hotelling's principal components appear to be of no use at all in this situation. There will be no bridge over from the principal axes of the ellipsoids of density of the " workmen " (to shorten the phrase

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[1] *See* GODFREY H. THOMSON, "Technique in Factorial Analysis."—*Journ. of Educ. Psychol.*, January, 1936, pp. 48-54.

" persons already engaged in the occupation ") to the scores of the candidate in a different set of tests, even supposing as we shall do that this different set has been given to some population or other of persons, and analysed into components. As they stand, at any rate, Hotelling's components are local coinage only, not available for exchange outside their own area.

The case is different with Spearman or Thurstone factors, though we must take care to see that we are not deceived into identifying two factors because they have been given the same name by someone. The tests given to the " workmen " (including the occupation itself as a " test ") have been analysed into certain factors, and in consequence an equation is offered specifying the composition of this occupation as being, say,

$$\cdot 723\, g + \cdot 468\, v + \cdot 309\, w + \cdot 403\, s_0$$

where g, v, and w are more or less well defined and named factors, and s_0 is a specific of the occupation. "A specific of the occupation " means something which the common factors g, v, and w leave out of account : and these common factors have not been chosen to describe the occupation completely, but to describe the correlations well and to be as few as possible, *a procedure which has magnified* s_0.

The different set of tests which we give to the candidate has also, we must suppose, been given to a number of people, and analysed into factors. (For simplicity we are leaving out of account in this argument the fact that this is hardly likely to be mathematically a comparable sample with that on which the analysis of the occupation has been made.) This analysis has maximised the specifics, but has named a number of common factors, including, let us suppose g, v, w, and some others, call them x, y, and z. The identity of this g with that other, or of this v with that other, must be somewhat hazardous if as we are supposing the tests are different. At some time or other, possibly by a chain of experiments, the one set of tests must have been brought into comparison with the other at second or third hand to justify this identification. Possibly, too, some of the tests are the same in both sets. Let us grant that the factors are the same, as we have also granted that selection troubles may be assumed non-existent. What about the specific s_0 (magnified by the method) of the occupation ? May not some of the other factors, x, y, z, or even some of the (maximised) specifics of the candidates' tests, form part of s_0 ? Might this not have been discovered if we had clung less desperately to the practice of using as few common factors as possible, and thereby making specifics as large as possible ?

V.—CONCLUSIONS.

I conclude with certainty that in vocational and educational advice we should wherever possible avoid using factors at all and use direct estimates. I conclude with less, but still with considerable, certainty that Hotelling's principal components are useless for vocational advice. I have no doubt that Spearman-Thurstone factors can be so used, but am very dubious indeed about their efficiency. They cannot in any case be any better than a direct estimate, and I think, if factors must be used, that their principle of maximising the specifics makes them less efficient than a system of more numerous factors would be. The difficulty of course lies in deciding on a principle for defining the latter, and this is the strength of the Thurstone position. Everything, however, seems to me to point to the advantage of direct estimation without factors.

RÉSUMÉ.

L'AUGMENTATION AU MAXIMUM DES FACTEURS SPÉCIFIQUES DANS L'ANALYSE DES APTITUDES.

L'auteur fait remarquer que le principe de Thurstone (qui comprend celui de Spearman) de réduire au minimum le nombre des facteurs communs implique l'augmentation au maximum de la valeur des facteurs spécifiques. Ceci est illustré par des exemples numériques avec diagrammes. (L'on mentionne le fait que certaines exceptions, mathématiquement possibles, ne peuvent se présenter dans la pratique.) Par conséquent, bien que le petit nombre des facteurs communs chez Thurstone reproduise bien les corrélations, il reproduit mal les notes des tests, et porte à l'erreur dans l'orientation professionnelle, sauf dans ces cas où l'emploi est déja inutile puisqu'une évaluation directe des tests au choix d'une profession, sans l'intermédiare des facteurs, donne le même résultat. Si l'évaluation directe est impossible, l'emploi d'un système de facteurs qui en augmente les spécifiques, ci-inclus celui de la profession, est dangereux.

L'on récuse l'analyse de la nature des facteurs spécifiques avancée par Thurstone, vu qu'elle affirme que des erreurs fortuites variables et des erreurs d'échantillonnage produisent des facteurs uniques. Les erreurs d'échantillonnage produisent un système de facteurs communs, et les erreurs fortuites variables peuvent le faire aussi. L'auteur doute également que le facteur spécifique d'un test puisse être résoler par l'analyse en facteurs communs (comme l'espère Thurstone) si l'on suit dans chaque test le principe d'augmenter au maximum la valeur des facteurs spécifiques.

ZUSAMMENFASSUNG.

STEIGERUNG DER SPEZIFISCHEN FAKTOREN AUF DEN HÖCHSTEN GRAD IN DER ANALYSE DES KÖNNENS.

Der Verf. weist darauf hin, dass der Thurstone'sche Grundsatz (welcher auch den Spearmans einschliesst), die Zahl der gemeinsamen Faktoren auf das kleinste Mass zurückzuführen, die Steigerung der Grösse der spezifischen Faktoren auf den höchsten Grad einschliesst. Dies wird durch zahlenmässige Beispiele mit Diagrammen erläutert. (Es wird bemerkt, dass gewisse Ausnahmen hierzu, die in der Mathematik möglich sind, in der Praxis nicht vorkommen können.) Obgleich so die geringe Zahl der Thurstone'schen gemeinsamen Faktoren die Korrelationen gut wiedergeben, geben sie die Ergebnisse der Prüfungen schlecht wieder, und sie können falsch sein, wenn es sich um Berufswahl handelt, ausser in Situationen, wo ihre Verwendung sowieso unnötig ist, da eine unmittelbare Schätzung aus Berufstesten, ohne die Einmischung von Faktoren, dann dasselbe Resultat ergibt. Wenn die unmittelbare Schätzung unmöglich ist, so ist die Anwendung eines Faktorensystems gefährlich, das die spezifischen Faktoren vergrössert, den spezifischen Faktor des Berufs einbegriffen.

Thurstones Analyse der Art spezifischer Faktoren wird angegriffen insofern sie behauptet, dass veränderliche Zufallsirrtümer und Stichprobenirrtümer zu alleingen Faktoren führen könnten. Stichprobenirrtümer führen zu einem System gemeinsamer Faktoren, und veränderliche Zufallsirrtümer können das Gleiche tun Der Verf. zweifelt auch, ob der spezifische Faktor eines Tests in gemeinsame Faktoren analysiert werden kann (wie Thurstone hofft); wenn der Grundsatz, die Grösse der spezifischen Faktoren auf den höchsten Grad zu steigern, bei jeder Analyse beibehalten wird.

TESTS OF LITERARY APPRECIATION.

BY E. D. WILLIAMS, L. WINTER AND J. M. WOODS.

I.—*Problem, subjects and tests.*
II.—*Factors influencing the tests.*
III.—*Correlations between tests and estimates.*
IV.—*Correlations with intelligence.*
V.—*Conclusions.*

I.—PROBLEM, SUBJECTS AND TESTS.

Problem.—The investigations which form the subject of this paper were planned as part of a co-operative research on the testing of æsthetic appreciation, and were carried out between the years 1931 and 1936, first at the Institute of Education and later at the Psychological Department of University College. The main objects of the wider inquiry were to devise practical tests of æsthetic appreciation for purposes of educational and vocational guidance, and, incidentally, to ascertain how far the various manifestations involve a general æsthetic capacity entering into all, how far they depend on general intelligence, and in what ways they are influenced by temperamental type, social environment, school teaching, and the like. The general plan and problem were suggested by Professor Burt; and, as regards method, we have chiefly followed the technique suggested by him as suitable for such purposes, namely, correlating persons instead of tests.

Results already obtained with this method as applied to appreciation of pictures and of objects of industrial art have been published elsewhere;[1] and some tentative conclusions from the testing of musical and literary appreciation may be found in degree theses on these subjects. The present paper is primarily concerned with the appreciation of poetry and prose.

Subjects.—The data selected for analysis here were collected mainly from four schools of four different types. Tests were applied to seventy girls aged from 11–14 in the top classes of an elementary school, fifty-seven girls aged 13–15 at a central school, forty-nine girls aged 13–16 at a secondary school, and eighty girls aged 12–17 belonging to two 'houses' of a large public school. For the preliminary work boys as well as girls, adults as well as children, were tested by much the same tests.[1]

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[1] C. BURT, "The Psychology of Art" (*How the Mind Works*, 1933, pp. 294 *et seq.*); M. BULLEY and C. BURT, *Listener*, IX, 1933; M. BULLEY, "Æsthetic Judgments of Children" (this *Journal*, IV, 1934, pp. 162-182); H. DEWAR, "A Comparison of Tests of Artistic Appreciation" (*ibid.*, VIII, 1938, pp. 29-49).

Tests.—Preferences are relative. Hence, in comparing the preferences of a given person with those which we regard as ideal, we cannot ask (as we might in a test of spelling or arithmetic) how many has he got right out of a total of so much; we can only ask how closely does his order or his grading agree with the standard accepted. This means that our measurement of a person's ability will be obtained by correlating that person's grading with the ideal. To obtain a reliable figure we may base our correlations either on one long series containing a large number of items or on a number of short series each containing only a few items.

Since the judgment is to be expressed on the æsthetic form not on the concrete subject-matter, we may seek to neutralize the influence of differing subjects either by mixing a wide variety or by keeping the subject constant within each group of items to be compared. The first plan lends itself best to theoretical problems. It was originally devised by Burt for vocational tests among older persons.[2] For younger children the grading of a number of varied items in one long series is a task of some difficulty. Hence, for practical purposes, and particularly for group tests, the opposite plan might seem at first sight to be preferable. Here the child compares not twenty or thirty items at a time, but only two or three. The method of 'paired comparison' exhibits the principle reduced to its simplest conceivable shape. In their experiments with æsthetic tests in group form, Burt and Pelling found that something intermediate between these two extremes gave the best results—more particularly the procedures which they have termed the 'method of triple comparison' ('with' or 'without constant subjects'), and the 'method of modified versions.'

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[1] The testing at the elementary and central schools was carried out mainly by Miss Winter and Miss Woods, and at the secondary and public schools by Miss Miles, Miss Woods, and Miss Williams. We are also indebted to Miss Miles and Miss Bennett for assistance with the tests of artistic and musical appreciation. Miss Mary Wright took part in the earlier work on musical appreciation, but unfortunately had to return to Canada before the work was completed: we are, however, grateful to her for the loan of gramophone records and of other test-material which she had collected. In addition we must acknowledge the kindness of the various head mistresses in permitting us to work in the schools and of the assistant mistresses in ranking the children in order of their ability in the various subjects concerned. To Dr. E. P. Gurrey, Lecturer in English at the Institute of Education, we are grateful for suggestions in regard to the choice and sources of test-material during the initial stages of the work.

[2] As applied to artistic tests among children, both method and results were briefly described by Burt in 1933 (*loc. cit. sup.*, pp. 289-292); the mathematical assumptions and limitations have been more fully discussed in his recent papers on the subject (this *Journal*, VII, ii, pp. 172-195; *Marks of Examiners*, pp. 245-314 (a defence of the method against some of its critics); *Brit. Journ. Psych.*, XXVIII, i, pp. 59-96).

In a recent number of this *Journal* (VI, i, p. 55) the method is described as being now available for the first time in the history of the subject.' It was, however, used for the investigation of types of imagery as long ago as 1912 (see this *Journal*—then the *Journ. Exp. Ped.*—I, pp. 273 *et seq.*); and has been repeatedly employed by research-students at the Institute of Education for several kindred problems, on the basis of roneo'd instructions and working sheets. The procedure and its various modifications have so often been described in earlier theses and in subsequent articles that we need attempt no detailed discussion here.

A.—*Age Scale Test* (*Constant Subject*). The first t.st was based on Burt's scale of English composition. The material consisted of fifteen compositions, all dealing with the same subject, namely, 'School,' and consisting of abridgments of actual essays by school children, corrected for spelling errors, punctuation, and the like. Eight of the samples printed were taken as typical of each age from seven to fourteen; and the remainder were compositions selected as intermediate between the successive pairs.[1] The task was to rank the passages in order of merit: and the testee's 'mark' was the correlation between his order and the true order. Since the test-pieces form a rectilinear scale, the correlation was calculated by the method of rank-differences squared.

B.—*Ranking Method* (*Mixed Subjects*). The second test consisted of forty short extracts, varying over a wide range of literary merit, the best being taken from classical writers and the worst from the efforts of backward children. It was drawn up in two forms—prose and poetry—to be given on different days. The extracts were typed each on a separate card. The child was first asked to sort the passages into three piles—'liked,' 'neither liked nor disliked,' 'disliked'; then, as he proceeded, he was pursuaded to subdivide each pile into three or four smaller piles, to which marks were to be assigned. Since the test material, it was presumed, would approximate more to a normal than to a rectilinear distribution, Burt's standard scale of marking[2] was adopted, which gives normal frequencies and a standard deviation of unity. The test was carried out individually; so that the child received adequate aid and supervision in assigning the right number to each pile. As before, the correlation between the child's grading and the 'true' grading (here based on the judgments of literary experts) provided the measure of his powers of literary appreciation.

C.—*Paired Composition* (*Modified Versions*). The third test consisted of Burt's literary appreciation test. This consists of sixty pairs of extracts—thirty in prose and thirty in verse. Each pair consists of two alternative forms of the same sentence or couplet, and the child is required to mark the better.[1]

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[1] *Mental and Scholastic Tests*, pp. 395-398. Burt's scale had already been used for purposes of vocational testing—e.g., to test the power of intending teachers, or of examiners, to judge the merit of children's compositions. For testing the brighter children in the top forms of the secondary and public schools the original form of the test appeared a little too easy; and additional passages were therefore added to obtain a finer and a fuller grading.

[2] *Distribution of Educational Abilities*, p. 49. In the revised form of this scale Burt suggests nominal marks of 0 to 10 instead of 5 to 15 (unless the number of items is over 100); and the standard deviation is 2·0. The scale has been widely adopted by those who have used the 'Q-technique.'

D.—*Triple Comparison* (*Modified Versions*). In the public school a somewhat harder and longer test was used, constructed by Miss Williams. This consisted of fifty sentences, and was confined solely to prose. Three versions (instead of two) were given for each sentence. To bring out different aspects of appreciation, this test was divided into three sections—those in which excellence depended upon the sound of the sentence, those in which it depended upon the logical construction of the sentence, and those in which it depended upon the aptness of particular words.

E.—*Triple Comparison* (*Constant Subjects*). The last test consisted of thirty short extracts of prose and thirty of poetry. But the test material was so chosen that three extracts referred to the same topic and ten familiar topics were dealt with in each series. The best extract was usually selected from the *Oxford Book of Poetry* or *Prose*; the worst from popular magazines; and the intermediate from an author of an intermediate type. In both tests D and E the mark was the sum of the correlations between the child's order (for each triplet) and the correct order.

F.—For the appreciation of pictures and of household objects, two tests were included in each case: in the first the ranking principle with 'mixed subjects' was employed; in the second the method of paired,[2] triple, or quadruple comparison with 'constant subjects.' The tests used have already been described by Burt, Bulley, and Dewar.[3]

G.—For testing musical appreciation three group tests were employed, based on much the same principles as above, namely, (1) ranking with mixed subjects, (2) paired comparison with constant subjects, and (3) triple comparison with altered versions. For the first test the children were given the names of ten tunes familiar to them all; they were asked to imagine that they were arranging a programme for a concert and to mark the tunes in order of choice. For the second test, ten pairs of gramophone records were used—those in each pair being of similar character, but very different merit;

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[1] The test was originally constructed for work on vocational guidance or selection (testing clerical workers, children wishing to take up a journalistic or secretarial career, and the like). The prose section consists for the most part of specimens of faulty English style, drawn from such works as Bain's *English Composition*, Abbott's *How to Write Clearly*, Williams' *Plain Prose*, Warde Fowler's *King's English* and *Dictionary of Modern English Usage*. A few have been constructed by taking sentences from classical writers (many are from Saintsbury's *History of Prose Rhythm*) and modifying them so as to impair the literary effect.

The poetic extracts were compiled largely from earlier and later versions of passages from Keats, Coleridge, Wordsworth, Tennyson, Rossetti, Meredith, Myers' *St. Paul* and Fitzgerald's *Omar Khayyam*. Usually the poet's second version is taken to be the better; but in a few instances, nearly all from Wordsworth, Matthew Arnold's judgment is accepted, and the earlier version is preferred.

It will be observed that, from the mode of construction, the subject of each pair of extracts is almost inevitably the same. The few exceptions again occur in lines from Wordsworth: here the motive for the poet's revision was apparently to improve the moral tone of the passage rather than the literary.

[2] As with the literary test, only pairs dealing with the same subject were compared, not (as is more usually implied by the phrase 'paired comparison') each item with every other.

[3] DEWAR, this *Journal, loc. cit. sup.*, and references there given.

the children were asked to say which of the two extracts they liked better. Finally, three versions of the same brief piece were played on the piano, and the children were asked to indicate the best and the worst. Only ten pieces—each very brief—were played at a single sitting; but three sets in all were given, each on a different day.

H.—The intelligence of all the children was tested by group tests—the older and brighter children by Burt's Group Test No. 33 (published by the National Institute of Industrial Psychology), the younger children with the booklet in his Northumberland 1925 Series. A small group at two elementary schools were also tested individually by means of the Pintner-Paterson performance tests.

II.—FACTORS INFLUENCING THE TESTS.

The first problem is to decide whether there is any common capacity that can be called literary appreciation—whether, that is to say, the judgments of the individual children appear predominantly determined by a factor shared in differing degrees by each, or whether their specific interests, aptitudes, and prejudices outweigh any general influence that might affect them all. Neither the quality judged nor the capacity for judging it can be simple; both are, beyond a doubt, highly complex resultants. The question merely is: Do the various persons judging the test-material base their judgments implicitly on much the same standards and criteria, or do the grounds for their preferences vary so much from one individual to another that no comparable testing is possible?

To answer this question the most obvious plan is to examine how closely the grading given by each child correlates with the others and how far the correlations are explicable in terms of one statistical factor. The ranking tests lend themselves best to such a procedure. For the factorization of correlations between persons Burt distinguishes[1] two alternative methods—' method a ' (analysis by submatrices), ' method b ' (analysis of the matrix as a whole). The former is a ' group factor ' method; the latter a ' common factor.' Sometimes one, sometimes the other, has apparently been used by subsequent investigators, without

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[1] *Marks of Examiners*, p. 306. Generally (though not exclusively) the 'group-factor' method ('a') is adopted only when the coefficients can be grouped together to form two or more submatrices of positive figures separated by submatrices of zero or negative figures. A two-fold pattern of this nature occurs most frequently after the first or general factor has been partialled out; but it may be seen in the observed correlations when the general factor or average has been virtually eliminated in other ways (e.g., with homogeneous populations or material, or with measurements reduced to deviations about their average: cf. *Brit. J. Med. Psych.*, XVII, ii, p. 177). Even then the whole table may still be analyzed in terms of a common or 'universal' factor ('method b') which will now be a 'bipolar.' At times, however, the variables form discontinuous groups: for instance, in correlating scholastic tests, the tests of (i) handwork, (ii) arithmetic, and (iii) verbal subjects (such as reading and spelling), yield three discrete blocks of positive correlations. Similarly, when we mix three different groups of children (e.g., three widely separate age-groups) analogous phenomena appear. In such a case the group-factor method—taking the positive correlations in sub-groups and postulating a separate factor for each positive submatrix—is more suitable; (a typical example is the analysis of school subjects in *Distribution and Relations of Educational Abilities*, 1917, Table XX, p. 57).

TABLE I.

TEST B—PROSE: CORRELATIONS BETWEEN PERSONS.

Persons	*a*	*b*	*c*	*d*	*e*	*f*	*g*	*h*	*i*	*j*	*k*	*l*	*m*	*n*
a		·72	·87	·62	·59	·82	·83	·77	·69	·44	·54	·70	·55	·45
b			·51	·88	·95	·50	·71	·34	·55	·77	·83	·22	·30	·28
c				·30	·23	·87	·47	·89	·71	·12	·27	·87	·66	·46
d					·91	·33	·69	·14	·45	·82	·84	– ·02	·17	·35
e						·89	·70	·06	·42	·86	·87	– ·09	·12	·33
f							·46	·86	·66	·17	·30	·85	·59	·41
g								·35	·54	·55	·60	·27	·29	·33
h									·62	– ·01	·12	·96	·62	·40
i										·30	·39	·57	·44	·37
j											·72	·13	·08	·28
k												·01	·15	·32
l													·63	·34
m														·27
n														

The probable errors range from ± ·02 (for a coefficient of ·89) to ± ·11 (for a coefficient of – ·02).

Of the various investigators who have attacked problems analogous to our own, Burt, Beebe-Center, and Dewar all assume that a random sample of persons (or rather their measurements) form a continuous series, and have therefore applied ' method b.' One investigator, however, maintains that persons are divisible into discontinuous types, and therefore prefers to use Burt's ' method a ' (Stephenson, this *Journal*, VI, i, p. 52 : from Table IV it appears that he would apply ' method a ' to raw correlations as they stand, even when the variables are not discontinuous and when the table of correlations shows no sign of a negative submatrix ; for the rest his particular technique is identical with Beebe-Center's, and consists simply in applying Spearman's two-factor formulae). Owing to the presence of more than one factor (a point on which all seem agreed) we have preferred to use the least squares method as originally described by Burt. With this method there is no longer any need to calculate tetrad differences : the real point at issue is not whether the ' general factor ' is the *sole* factor (strictly no doubt it never is), but what is its proportionate contribution to the total variance as compared with that of other and less significant factors.

expressly discriminating the cases to which each method is appropriate. According to Burt, ' method a ' should only be applied when the variables correlated form a discontinuous series. ' Method b ' therefore is the proper method here.

To print the whole set of correlations in detail is neither necessary nor practicable. As a specimen we have taken results from a random sample obtained by selecting every fifth child from the elementary group arranged in alphabetical order, and print correlations for Test B—Prose (Table I). It will be seen that the figures approximate fairly closely to a hierarchy. The first or most general factor is an ' absolute ' or ' positive ' factor (i.e., its saturation coefficients are exclusively positive): it accounts for 55 per cent of the total variance; the next is a ' bipolar ' factor and accounts for only 18 per cent; the remaining factors are statistically insignificant (Table II). Similar results are found with the other tests (Table III).

TABLE II.

TEST B—PROSE: SATURATION COEFFICIENTS FOR PERSONS.

Persons.	*a*	*b*	*c*	*d*	*e*	*f*	*g*	*h*	*i*	*j*	*k*	*l*	*m*	*n*
First factor ..	·91	·87	·82	·74	·73	·82	·72	·72	·71	·68	·67	·62	·51	·48
Second factor ..	·18	–·44	·54	–·58	–·68	·46	–·25	·67	·18	–·62	–·53	·73	·37	·07

TABLE III.

TESTS A AND B—PROPORTION OF VARIANCE DUE TO FIRST AND SECOND FACTORS.

	First Factor.	*Second Factor.*
Test A	64 per cent	12 per cent
Test B (Prose)	55 per cent	18 per cent
Test B (Poetry)	49 per cent	22 per cent
Average	56 per cent	17 per cent

Nature of the first factor.—To demonstrate the predominance of a single common factor in the judgments of the various children is not to prove that this factor must necessarily be literary appreciation. On this further issue we may get light from various directions. First of all, before finally selecting our test material, the passages were submitted to competent critics of English literature, and from them we obtained an order or expression of preference for the various passages concerned. Now if in tests A and B we weight the order given by each child in accordance with his saturation coefficient for the first or general factor, and then sum the orders so weighted, we reach a theoretical order which we may regard as the best representative of the opinion of the children as a group. For Test A this is identical with the order given by the 'mental age' represented by each specimen composition, which in turn is identical with the order assigned by the experts; for Test B the children's order is almost identical with that given by expert adult English critics, the correlation between the two orders being ·98 for the prose form and ·96 for the poetical. Moreover, it has been shown[1] that the correlation of a given person with the amalgamated order obtained from all the persons in the group is identical with that person's saturation coefficient for the first factor. It follows, therefore, that this saturation coefficient might itself be taken as a fair measure of his literary appreciation.

Secondly, by encouraging the children to discuss their preferences during the course of the individual tests and at the end of the group tests, we obtained a good deal of light on their actual mental processes. On roughly tabulating the comments made by children at different years (including those of the young boys and girls tested during our preliminary trials), it quickly becomes obvious that, with increasing age, there is a steady increase in references to the more specifically literary merits and a steady diminution in judgments based upon irrelevant features, such as the concrete nature, or emotional appeal, of the subject matter.

The predominant motives vary and change appreciably up to a mental age of eleven. With the youngest and the dullest of all, the choice seems most often determined by the *subject* of a passage—the thought expressed, the scene described, the moral implied: they like what interests them. One child of eight, for example, writes: "I like this bit best of all becos it is about dogs and I am very fond of dogs." Where the subject comes home to them personally—as in the subject for the age-scale test ('School')—even older children have much difficulty in preserving the detachment required to judge style of presentation as distinct from truth to fact. Up to the age of ten among the boys, and two or three years later among the girls, the *ethical intensions* of the writer form one of the commonest criteria: if a passage or a sentence conveys what the Americans would call 'uplift,' it at once takes a high place: Martin Tupper ranks well above Keats or Coleridge

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[1] *Brit. Journ. Psych.*, XXVIII, i, p. 89.

At almost every age *clarity* formed a recurrent ground for preference. Nonsense-verses from *Alice in Wonderland* are frequently given a low place because (as one child puts it) " I cannot understand what this means." Intelligibility, it may be remembered, was a quality which Miss Dewar found constantly figuring in the reasons for children's preferences in pictures : what they cannot understand, they dislike. The younger child requires lucidity alike in poetry and in prose ; the older seems more ready to dispense with it in poetry. With the younger and the duller it was clarity relative to the child himself ; with the older and brighter pupils it was rather clarity as such—the child's comments implying (usually quite correctly) that the reason for his inability to understand lay with the writer rather than with himself.[1] The majority would evidently endorse the dictum of Mr. Somerset Maugham : " Clearness is the first essential of good style." A few of the more intelligent adolescents, however, are evidently intrigued by what is problematic and enjoy an impression of the mysterious and profound ; in poetry more particularly they may be actually repelled by what is so clear as to seem to them trite : they prefer Marie Corelli to Wordsworth.

By the mental age of twelve a sense of the more specifically literary qualities comes definitely to the fore. Even among the children of the elementary schools, coming from quite uncultured homes, we found a sense of literary excellence far beyond what most of the teachers themselves had anticipated. In commenting on Test C, for example, the teacher would often observe that it seemed unfair to expect children to see weaknesses in phrases which poets like Wordsworth or Keats had originally passed. Yet 73 per cent of the children rejected Keats' original phrase, " wretched wight " in favour of his later amendment, " Knight at arms " (in *La Belle Dame Sans Merci*) ; and 87 per cent reject " A simple child, *dear brother Jim*," in Wordsworth's earlier version of *We are Seven*.[2] Their comments often touch the mark at once. In Burt's test there are two versions of a couplet from *Love in a Valley*. That published in 1851 runs as follows :

> Under yonder beech tree *standing* on the greensward
> Couched with her arms behind her *little* head.

In the 1878 edition Meredith changed the words italicized to ' single ' and ' golden.' One girl of twelve writes : " I liked this (the later version) at first just because it sounds nicer ; but I think the real reason is that it tells you more. If she was a little girl, of course, she had a little head ; and if she was couched she couldn't have been standing." Another of thirteen writes : " It is much more interesting to know that her hair was ' golden ' than that it was little, and that she was all alone under the tree than that she was just standing up like anybody else."

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[1] When passages of different difficulty are employed the first factor becomes more or less identifiable with general intelligence, showing that similarity in ranking is produced by similarity in understanding ; the second is a bipolar factor, and is identifiable with an appreciation for form as contrasted with matter or emotional interest. This tallies with what is found in pictorial appreciation : (cf. BURT, *loc. cit.*, p. 309, DEWAR, *loc. cit.*, p. 45).

[2] One child of ten, familiar with the piece, comments : " I have often wondered why it did not ryme : but I would rather have no ryme at all than a bad one." (In the earlier version ' Jim ' rhymes with ' limb.')

Among the older and brighter children there are frequent references —though in crude and non-technical language—to the logical structure of the passage, to the aptness or inaptness of a metaphor or simile, and to the ingenuity of the thought, expression or vocabulary.[1] A number show a relish for far-fetched words and picturesque allusions, and take ornament, flourish, and the ' elegant variation ' to be the marks of a good writer ; but the best nearly always prefer simplicity and sincerity. Wordsworth, for example, has two versions of a line in his *Descriptive Sketches among the Alps*:

(1) Under a hoary oak's thin canopy.
(2) Beneath an old grey oak as violets lie.

Up to the age of thirteen a vast majority prefer (1), no doubt because (as one of them puts it) " ' hoary ' is a poeticle word," or (as another puts it) " You could say ' where's my old grey hat ? ' but not in poetry." After that age, (2) steadily grows in favour : " Violets under an old grey oak," says one, " makes a pretty picture, and it sounds best. The hoary oak with a canopy sounds like someone trying to use big words for effect."

Even with the younger a reference to sound or rhythm appeared again and again in reasons given for the liking or disliking of the poetic extracts ; it was hardly ever mentioned, even by the older children, in the case of prose.

In general, we believe our experiments reveal the beginnings of a genuine literary sense at a much earlier age than teachers are apt to assume. Too often the pupil's attention is fixed exclusively on points of spelling, grammar, and the like, to the complete neglect of his sense of beauty. In one particular class, nearly every child criticized Keats' earlier version[2] of his *Ode to a Nightingale* " because ' keelless " and ' faery ' are spelt wrong " ; yet in the same school, and *in a lower standard*, a number of children were able to suggest the correct reasons for the poet's amendments. The sense of beauty seems to develop even before the power of clear understanding ; and a spontaneous interest in the niceties of grammar or spelling comes, if it comes at all, at a much later date.

Nature of the second factor.—The second factor emerges most plainly in the tests of poetry. Unlike the first, it is a bipolar factor, i.e., its saturation coefficients take both positive and negative values : (see Table II). It thus tends to divide the persons correlated into two antithetical types. A comparison of the passages and authors chiefly responsible for the contrast indicates its general nature. Extracts from Pope, Spenser, Johnson, Dryden, Wordsworth, and Macaulay rise high in the ranking of the first group; extracts from Shelley, Byron, Ruskin, Browning, Coleridge, and Carlyle in the ranking of the other. The children's comments show that they are themselves dimly aware of the difference. To take only two of the children mentioned in the table above (Table I), child *c* (a shy, repressed girl of thirteen, the cleverest in her class, with a positive coefficient for this factor) declares she likes the verses from Pope " because they are so clear and polished " ; child *e*, on the other hand (a lively and impulsive girl, with a mark for general appreciation almost as high as *c's*, but a negative coefficient for the second factor), dislikes the same extracts " because they are just a dull common-place with very mechanical rhymes." But *e* enjoys a passage from Ruskin because it " seems so full of thought and fancy, and really stirs up your feelings " ; whereas *c* criticizes it because " the style is too flowery and fanciful." These differences of standpoint may perhaps be summed up as follows : there is one type of critic, who judges mainly by form, methodical construction, truth to fact or logic, and so prefers writers with a ' classical ' style ; there is a second type, who is moved more by sentimental appeal, imaginative comparisons, rhetorical figures of speech, and the like, and so prefers writers of the ' romantic ' school.

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[1] Burt gives a good illustration from an earlier form of this test. To a number of secondary school children of 14 to 16 he gave Bentley's emendations of *Paradise Lost* and Dryden's improvements on *Antony and Cleopatra*, side by side with the originals. He writes : At this age Dryden and Bentley get nearly as many votes as Shakespeare and Milton. At C—— School, 63 per cent prefer

No light, but rather a transpicuous gloom (Bentley),
to No light, but rather darkness visible (Milton).

'Among the boys the commonest criticism is of the following type : " How can anyone see darkness ? and if no one can see it it isn't visible ! " The girls like the word ' transpicuous ' (" I suppose it means the same as transparent," says one : " but that is a shopkeeper's word "). " Visible darkness is the sort of way you would talk about a cinema : they aren't words for poetry." '

[2] The earlier version has " Charm'd *the wide* casements . . . of *keelless* seas " for " Charmed *magic* . . " and " of *perilous* . . . "

' Keelless ' was taken to be a misspelling for ' keyless.'

Often both the child's preferences and the terms he uses are echoes of classroom teaching ; and not infrequently the characteristics admired are reflected in his own compositions. In one school a highly-coloured style is encouraged, and ' imaginative composition ' is deliberately practised ; in another, the mistress says : " Our aim is to get the children to express themselves simply, naturally, and sincerely, with more attention to outline or structure than to artificial rhetoric or emotion." At these two schools a corresponding contrast appears in our test-results.

The parallel[1] was also noted by Burt, and is clearly brought out by his reproduction test. The pupils were asked to reproduce in their own style a passage which they had read, or had read to them, a day or two before. We repeated the experiment in three of the schools; and our results confirmed his own. " Very easily in such class experiments, less clearly in the independent reproductions of the isolated child, two antithetical types or tendencies may be discerned. One type may be loosely termed ' positivist,' the other ' imaginative ' : the tendency of the first is to condense, to simplify, to generalize—to give a brief, bald précis of definitely recollected facts, unaltered and unadorned; the tendency of the second is to embellish and elaborate, to rationalize and vivify, to construct a concrete and interesting narrative, with every detail picturesque and every incident explained."[1] He relates these to differences in emotional attitude which he observed in earlier experiments at Liverpool;[2] and notes that they often reappear in the children's preferences in music and painting.

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[1] The compositions were judged by criteria not unlike those applied by Binet. The children whose compositions belong to Binet's ' observational ' or ' descriptive ' types generally have positive saturation coefficients for this second bipolar factor ; those whose compositions belong to his ' erudite ' or ' emotional, poetic, imaginative ' types have negative saturation coefficients. For Binet's own criteria, cf. WHIPPLE, *Manual of Mental and Physical Tests*, p. 290-1, for illustrations. BINET, *L'Année Psychologique*, III, 1897, pp. 296-332, ' Psychologie individuelle : la description d'une objet.'

We have endeavoured to verify this further suggestion by correlating the results of our literary tests with those of the tests for artistic and musical appreciation. We find a slight but definite tendency for each child to be consistent throughout. The most direct evidence is furnished by working out each child's saturation coefficient for the type-factor in each of the three kinds of test, and then correlating these coefficients. The correlations are not high: they are ·28 for the poetry and music tests and ·21 for the poetry and pictorial tests; with the prose tests the correlations are but little above zero.

Since the differences are often discernible even among children of the same school, taught by the same teacher, and are shown in so many different directions, it is tempting to infer that they rest on a difference in individual temperament. "We might," says Burt, "perhaps summarize each type as follows. The comments show that their chief interest lies: (1) in the thing actually pictured or described (the objective type); (2) not in the thing itself, but in its effects upon themselves (the subjective type) . . ." He adds that the peculiarities of the repressed, inhibited, or introverted temperament, on the one hand, and of the expressive, aggressive or extraverted type, might intelligibly lead to precisely these preferences: the alleged differences between the introvert and the extravert attitude "come out clearly in literature and art . . . in the classic type and in the romantic type, the one formal, rational, and conventional, the other wild and erratic, bursting into extravagance and revolt."[3] At the same time, he insists that the so-called types can be no more than tendencies, and deprecates any hasty identification of one particular temperament with one particular appreciative type. "Repression and expression, inhibition and extraversion, are names of complex processes or mechanisms rather than of simple innate temperaments. The analogies are to be studied as a matter of partial or imperfect correlation rather than of complete identification." In the pre-adolescent, he believes, it is the extravert who likes emotional self-expression and the introvert who prefers restraint (we have already noted something of this sort in discussing the preferences of *c* and *f*; and many other instances could be given from children of the elementary schools). During and after adolescence, however, it is the introvert who privately revels in romantic extravagance—" breaking out irregularly against solemn social restraints," and the extravert whose " view is fixed upon the outer world and who gives direct and immediate expression to his thoughts in an objective and communicative way."[1] Here we could add several examples from the older girls at the secondary school : to borrow a familiar distinction from Schiller, at this later age it is the extravert who prefers ' naive poetry ' and the introvert who likes ' sentimental.' But to generalize from a few conspicuous instances would be rash. At all stages and in all persons, and in nations and in epochs as well as in individuals, " it is not simply the peculiar temperament of the individual or the group, but rather that temperament as it accepts or reacts against the conventions of the place and moment, that determines the form of art preferred and the mode of self-expression selected."

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[1] *Mental and Scholastic Tests*, p. 279.

[2] *Eugenics Review*, 1912, p. 22. On the basis of a series of simple tests, Binet had noted "a marked opposition between the temperaments" of his two daughters, Marguerite and Armande (*L'Etude expérimentale de l'Intelligence*, 1903). Burt "on repeating the same and similar tests on a large number of Liverpool children for other purposes . . . found that the same dichotomy unexpectedly recurred," and verified on a wider scale the same antithetical tendencies between "the objective and the subjective types" (as he then termed them). In more recent attempts to investigate the existence of what are now called extraverted and introverted types, he has included, amongst others, tests of appreciation in which the extracts differ not so much in literary merit, but in their 'classic' or 'romantic' tone and style. He finds well-marked preferences in certain individuals, often corresponding to the results of the temperamental assessments.

[3] *The Psychology of Art, loc. cit. sup.*, pp. 287, 215-6.

We may add that the emergence of such contrasts in the children's preferences is only possible because a similar variety already existed in the selections given to them to judge. Our passages were chosen so as to include almost every style and writer of importance. But it was the poetical extracts that gave rise to the sharpest divergences. The practical corollary is clear : if we desire to test literary appreciation generally, then our test material should so far as possible *avoid* any pronounced specimens of either literary style, and for the rest preserve an even balance between the two.

III.—CORRELATIONS BETWEEN TESTS AND ESTIMATES.

Correlations between different modes of æsthetic appreciation.

It is of interest to inquire whether the factors found in one form of appreciation also reappear in the remainder. The advocates of type-psychology have frequently urged that a type must not be defined in terms of a single variable or of a single test : it must be something that " covers the whole personality," or, at least, " manifests itself in many different aspects and through many different tests." But rarely, if ever, have they offered experimental evidence for this view. The simplest test would seem to be Burt's ' symmetry criterion.' Two sets of measurements obtained from the same group of persons are attributable to the same factors, if and only if the product of these two sets of measurements, or of the two sets of correlations obtained from them, itself forms a symmetrical matrix.[2]

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[1] *Loc. cit.*, p. 216. This second process seems implied in the conclusion reached in a more recent work by F. L. LUCAS (*Decline and Fall of the Romantic Ideal*, 1936, p. 277 ; we are indebted to Professor Burt for the reference) : " The fundamental quality of Romanticism is . . . a liberation of the less conscious levels of the mind. The Romantic intoxication of the imagination suspends the over-rigid censorship exerted by our sense of what is fact and what is fitting. The first dominates the Realist ; both inhibit the Classic ; the Romantic escapes."

[2] The result follows at once from the formula for the ' canonical reduction ' of the score and correlation matrices ($S=LV^{1}P$; $R=LVL'$: see this *Journal*, VII, p. 177). With the first form of the criterion the best choice in regard to the number and the pairing of the tests raises some difficulty ; hence the second form seems the safest as it is the quickest. If, however, a complete factor-analysis has already been carried out, then, no doubt, a detailed comparison of saturation coefficients is more instructive.

Accordingly, taking the group described above, we have correlated the measurement obtained by each child in the best of the literary tests with the measurements obtained by him and by every other child in the pictorial and musical tests. The divergences from symmetry are practically all insignificant when compared with the probable error of the difference. On multiplying together the correlation matrices the symmetry of each product matrix is still more striking. To print or discuss the various tables in full is scarcely necessary. Since only two factors are significant, it will be sufficient to examine the correlations between the saturation coefficients for the separate factors themselves: the figures for the second factor have been given above; those for the first will be given below.

TABLE IV.

CORRELATIONS BETWEEN TESTS AND ESTIMATES.

Test.	*A.*	*B.i*	*B.ii*	*C.i*	*C.ii*	*D.*	*E.i*	*E.ii*
A. (Age Scale)	(·65)	·63	·52	·57	·39	—	—	—
B.i (Ranking Prose)	·63	(·81)	·61	·74	·47	—	—	—
B.ii (Ranking Poetry)	·52	·61	(·94)	·53	·66	—	—	—
C.i (Modified Versions: Prose)	·57	·74	·53	(·73)	·44	—	—	—
C.ii (Modified Versions: Poetry)	·39	·47	·66	·44	(·65)	—	—	—
D. (Constant Subjects)	—	—	—	—	—	(·78)	·38	·40
E.i (Constant Subjects: Prose)	—	—	—	—	—	·38	(·41)	·32
E.ii (Constant Subjects: Poetry)	—	—	—	—	—	·40	·32	(·36)
Teachers' Estimates	·38	·66	·68	·71	·69	·54	·37	·49
Intelligence: (*a*) Group Tests	·39	·48	·53	·65	·62	·64	·51	·43
(*b*) Performance Tests	—	·51	·47	·63	·59	—	—	—

Correlations of tests with each other and with teachers' estimates.

So far we have discussed correlations between persons. The correlations between tests are shown in the body of Table IV. The 'reliability coefficients' are obtained from correlating two different forms or sections of the same test; as a rule, however, the separate sections were too short, and the alternative forms too imperfect, for much weight to be attached to the figures thus obtained. The correlations with the teachers' rankings are shown in the last line but one.

Judged by these various criteria, Test A (the age-scale) appears the least satisfactory. Children of the ages tested evidently find much difficulty in comparing the merits of complete compositions; and, as we have seen, the very reason that makes 'school' a suitable topic for a child's composition makes it an unsuitable topic for a child's literary appreciation: with older persons, and particularly students in training as teachers, this test seems to yield excellent results.

Test B appears more efficient, chiefly no doubt because it was given as an individual test. But, if we may rely upon the teachers' estimates, Test C seems more effective still. Nevertheless, with a group test such as this, much depends on the care and conscientiousness with which the particular class or school can carry out a critical task without individual supervision. Of the harder tests used at the public school, Test D proved unexpectedly satisfactory, and Test E disappointing. In Test E the sentences and passages selected were perhaps a little too difficult; perhaps also the number of items were too few, though an attempt at increasing the number made the test too long for the sustained attention of the pupils and for the convenience of the time-table. But at a public school the pupils necessarily form a highly selected group; and probably the correlations, as is almost inevitable in such cases, are lowered by this selection.

IV.—CORRELATIONS WITH INTELLIGENCE.

The high correlations with intelligence may seem at first sight surprising. In the popular view, æsthetic appreciation, like æsthetic creation, is a highly specialized talent; and we are continually told by teachers and educationists that unintelligent pupils who are failures in all the more general subjects of the curriculum may nevertheless show high artistic skill in painting, needlework, handwork, dancing, dramatic displays, in short, in every kind of craft where æsthetic taste and even originality are essential. Moreover, although their literary productions are poor, their power of appreciating good literature, it is said, is high. If, therefore, the psychologist believes that æsthetic capacity depends in part on general intelligence, the onus is upon him to explain how, and in what degree, intelligence enters in. Evidence on these points is of supreme importance for the psychology of æsthetics and may, we believe, be gathered from our results.

In his analysis of pictorial appreciation, Burt has outlined a psychological theory of art in the light of recent work[1]; and our own data, so far as they go, not only provide some verification for the general principles, but also confirm the suggestion that the theory is applicable to other forms of appreciation as well. The appreciation of literary qualities, like the appreciation of other æsthetic qualities, appears to depend essentially on an apprehension of form. Now the apprehension of form demands a power of fixing attention, not on the concrete items that make up the content of the object apprehended, but upon the abstract relations between those items and upon the relations between those relations and so upon the purely formal system into which the related whole is organized. If, then, as the theory implies, "our sense of beauty depends essentially on perceiving objects *in certain relations*,"[1] it is easy to see why intelligence, which by many psychologists is defined as the power to perceive or at least to realize relations, is essential to the æsthetic sense. The reason why this conclusion has so often been overlooked or denied lies in the fact that psychologists have commonly assumed that relations cannot affect our judgments unless they are *explicitly* educed. Neither in the act of artistic appreciation, nor even in the solution of intellectual problems,[2] is it necessary for the relations to be clearly discriminated and focused: it is the power to apperceive and attend to a relational *whole* as such that counts. In this sense, 'the laws of pictorial composition, like those of literary criticism, are essentially laws of attention.' And, so far as this is true, it will be the child with the highest apperceptive powers who is best able to recognize the characteristic form of a complex æsthetic whole.

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[1] 'The Psychology of Art,' esp. pp. 302 *et seq.*, in *How the Mind Works.*

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[1] BURT, *loc. cit.*, p. 302.

[2] This fact needs emphasizing. The teacher of to-day, following the modern educational text-book, seems to infer that, because intelligence is shown *most clearly* in the explicit eduction of logical relations, therefore it is manifested *solely* in processes of this nature. Consequently, scientific training is emphasized and æsthetic training neglected. For evidence of the statement in the text, we may refer to some of the earliest investigations in which the importance of relational thinking was demonstrated. Down to about 1909 almost the only manifestations of intelligence tested were simple sensory capacities, simple motor capacities, and, more rarely, some simple combinations of the two. On introducing more complex tests, Burt showed that intelligence correlated, not with general sensory discrimination as such, but with what he termed the "progressively integrative action of the mind"—i.e., as he elsewhere puts it, capacity for "systematizing" or "organizing" mental processes or contents (*Brit. J. Psychol.*, III, 1909, pp. 167-9). It was in this sense that Binet's definition of intelligence as power of attention was accepted and reinterpreted. The use of the word attention seems to have misled many teachers into supposing that the intelligent child is in the eyes of the psychologist the child who can, by an effort of volition, concentrate and apply his mind. Burt, however, makes the express proviso that attention is to be understood in the Herbartian sense: "Attention is essentially the power to perceive or apperceive a variety of items in a unified whole." It implies "organization of new associations . . . in a word, noetic synthesis."

In his investigation on 'Experimental Tests of Higher Mental Processes and their Relation to General Intelligence' (*Journ. Esp. Ped.*, I, 1911, p. 101) he distinguished higher processes of two kinds: first of all, those chiefly involving "mechanical association," which he finds "has but little relation to intelligence," and, secondly, those "involving the perception, implicit or explicit, of a relation." Among the relational tests he thus distinguishes "two subdivisions," and states that there is little to choose between the implicit and explicit forms. "Actually the most formal and the most typical of the reasoning tests gave the lowest coefficient of the group." Among the best were tests which, he says, "may be described as tests of apperception, depending upon a complex synthetic activity whereby we implicitly comprehend the essential character of the whole without explicitly analyzing it into its component parts or distinctly formulating their relations." Thus "the mere abstract thinker is not necessarily to be hailed as the most intelligent." We hope that a reminder of these results will do something to rehabilitate the claims of literary, humane, and æsthetic studies in addition to the more purely scientific.

This is borne out by the children's own comments. As Professor Valentine found in his experiments on musical appreciation, " it seems possible to form a fairly good estimate of the æsthetic development of an individual according to the extent to which he uses the higher or the lower types of judgment."[1] The child who displays poor appreciation of literary form is usually the child who is side-tracked (as his own remarks so often reveal) by personal associations aroused by the subject-matter, or, still more frequently, by isolated items which attract his interest to the neglect of the exposition as a whole. To note the formal qualities whether of a pictorial or of a literary object, a certain emotional detachment is needed. " In visual perception, owing to the practical requirements imposed on us by our everyday life, we tend to look beyond the mere visible appearances to the practical meanings conveyed: we only see what we know to be there, not what is there to be seen. To see things as they are demands a singular detachment from immediate interests; and to appreciate art for art's sake the spectator must be able to adopt an impersonal and disinterested attitude—an ability which requires intelligence as well as character." The same is true of literary appreciation. A dull girl of fifteen puts the best composition on ' school ' at the bottom of her list; asked why she considered it ' bad,' she replies: ' Because our school isn't like that at all.' This is analogous to the case of a child who insists that an argument must be sound because the conclusion is true. " Whether we are solving a test of reasoning, or seeking to appreciate a picture or a play, a kind of ' psychical distancing ' is requisite ": what has been termed ' suggestive dominance '—the power of certain items of the verbal content to arouse irrelevant interests of a more or less personal kind, and so to induce a state of emotional suggestibility instead of a state of impersonal criticism —is as responsible for lapses in taste as it is for errors in logic.[2]

There would seem to be two practical conclusions. First, intelligent apprehension need not necessarily be explicit apprehension. The intelligence of the practical man is more often of the intuitive type; the teacher is too apt to consider only those intelligent who reach true conclusions by a logic that is verbally formulated as distinct from those whose logic may be sound enough but not expressed in abstract terms. He assumes, for example, that unless a child knows grammatical rules he cannot speak grammatically. Secondly, since abstract formulation develops later than implicit apprehension, the teacher's mode of judgment tends to underrate the powers of the young. No doubt dull children whose low mental age is due to their dullness possess far higher powers of æsthetic appreciation than the previous generation of teachers had assumed. But if the same study is made of those who are not backward, we shall find that normal youngsters whose low mental age is due not to their dullness but merely to their youth have powers of appreciation at least equal to the older dullard of the same mental age.

When all is said, however, intelligence alone will not account for all the correlation between the various tests. In addition, there must undoubtedly be some factor more specific. The correlation between the two best literary tests (B.ii and C.i) is ·74 : on eliminating intelligence by partial correlation we are still left with a partial correlation of ·62 ± ·06. The correlations between a weighted average of the literary tests and the tests of pictorial and musical appreciation respectively are ·37 and ·26. The correlations of these three with intelligence are ·63, ·31, and ·22. Eliminating intelligence, we have for the partial correlation between literary tests and pictorial ·24 ± ·06, and between literary tests and musical ·16 ± ·06 (this last is barely significant). This largely confirms Burt's inference from his earlier test-results that "in criticism if not in creation, in the vast majority of persons if not in the specialist, and in the young if not in the old, æsthetic appreciation is dependent upon a 'group factor' common to all the various media as well as upon general intelligence and specific capacities peculiar to the different forms." At all events, æsthetic appreciation cannot be regarded *merely* as the outcome of intelligent apprehension applied to the æsthetic field. Certainly, judged by our tests, the child with high æsthetic capacity is nearly always a child with high intelligence : but the child with high intelligence is not necessarily a child with a high literary or æsthetic discernment.

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[1] *The Experimental Psychology of Beauty*, p. 101. The higher type of judgment is one in which " attention is concentrated upon the object itself rather than upon non-fused associations or on the self."

[2] BURT, ' Development of Reasoning in Children,' *Journ. Exp. Ped.*, V, 1919, p. 126.

To inquire what the additional element may be would take us too far afield. But one suggestion may be disposed of. Although the results of the tests of intelligence are positively correlated with the results of all three tests of æsthetic appreciation, the amount of correlation differs in each case ; it is distinctly higher with the literary tests than with the pictorial or the musical. At first sight one might be tempted to attribute this to a feature which both the literary tests and the group tests of intelligence have in common, but which is wanting in the pictorial and the musical tests, namely, the verbal content. To check this suggestion the children in one small group were tested by means of the Pintner-Paterson performance tests.

If the chief cause of the previous correlation was the verbal content we should expect the correlation between the verbal literary test and the non-verbal intelligence test to be almost zero, while the correlation with the appreciation of non-verbal material—i.e., music and pictures—would remain as it was or perhaps even rise. A reference to the actual coefficients (Table III) shows that no change of this sort occurs. The size of the correlations is but little reduced ; and the differences remain virtually unaltered. Except, therefore, when the verbal content of itself brings greater difficulty, a more plausible explanation would seem to be that the power of logical thinking—of apprehending abstract relations—which seems characteristic of the higher manifestations of intelligence, even when tested by so-called performance tests—is more essential to the appreciation of literary art-forms than to that of more concrete art-forms, namely, pictures and music. Doubtless the differences which obtain in execution obtain also in appreciation : as is well known, among the various subjects of the curriculum, 'English composition,' i.e., the production of a literary art-form, is far more highly correlated with intelligence than 'drawing' or 'handwork,' i.e., the production of visible art-forms.

V.—CONCLUSIONS.

(1) Five methods of testing literary appreciation have been applied to over 200 children of various ages. The marking is based on the principle of correlating the testee's grading with an ideal order obtained from literary experts.

(2) Thus tested, a capacity for literary appreciation is discernible, in a primitive form, at a much earlier age than is generally assumed, and increases steadily with increasing age.

(3) The capacity for literary appreciation correlates highly with intelligence and (to a smaller extent) with pictorial and musical appreciation. On eliminating the influence of intelligence, significant partial correlations remain, suggesting that æsthetic appreciation must also depend upon some general capacity of its own.

(4) For individual testing, the method of grading or ranking a set of mixed subjects appears to yield the most instructive results. For group testing the method of paired or triple comparison, with modified versions dealing with similar subjects, appears more appropriate.

(5) An analysis of correlations between persons by the method of least squares indicates at least two factors:

(*a*) The first factor is responsible for over 50 per cent of the variance. It is positive throughout, and appears to represent a general factor of literary appreciation. This is confirmed by the children's reasons for their preferences.

(*b*) The second factor is responsible for less than 20 per cent of the variance. It is bipolar; and suggests two minor antithetical tendencies or 'types', namely, a tendency to prefer classical writers and an objective style, and a tendency to prefer romantic writers and a subjective style. The distinction is analogous to that already noted by Burt in tests of pictorial and musical appreciation; and a small positive correlation is found between similar types of preference in all three æsthetic fields.

RÉSUMÉ.

DES TESTS DE L'APPRÉCIATION LITTÉRAIRE.

L'on a appliqué à plus de 200 enfants, d'âges divers, cinq méthodes d'évaluera l'appréciation littéraire. Sous une forme rudimentaire l'aptitude à apprécier la littérature se découvre à un âge beaucoup plus bas qu'on ne le suppose généralement; elle se développe, paraît-il, plus tôt que le pouvoir de la comprendre, et elle croît régulièrement à mesure que l'âge augmente.

Une analyse des corrélations entre individus indique au moins deux facteurs fondamentaux dans les tests : le premier représente apparemment un facteur général de l'appréciation littéraire ; le second, deux tendances moins importantes et opposées, à savoir, une préférence pour un style plus objectif (ou " classique ") et une préférence pour un style plus subjectif (ou " romantique "). Lorsqu'on applique le " critère de la symétrie " de Burt, l'on trouve que des facteurs semblables jouent un rôle dans d'autres formes de l'appréciation esthétique, par exemple la picturale et la musicale ; bien qu'ils soient fortement influencés par l'enseignement, il semble qu'on puisse les attribuer en grande partie à des différences dans l'attitude ou le type du tempérament.

Tous les tests montrent une corrélation élevée avec l'intelligence. Néanmoins, quand on élimine son influence, il reste des intercorrélations significatives. L'on peut donc en déduire que l'appréciation littéraire est, du moins en partie, une manifestation spéciale d'une aptitude à l'appréciation esthétique en général.

ZUSAMMENFASSUNG.

PRÜFUNGSMETHODEN BEI WÜRDIGUNGEN DER LITERATUR.

Fünf Methoden zur Prüfung der literarischen Würdigung sind bei über 200 Kindern von verschiedenem Alter angewendet worden. In primitiver Form kommt die Fähigkeit, die Literatur zu schätzen, viel früher vor, als man allgemein annimmt ; sie scheint sich noch früher zu entwickeln als die Fähigkeit, sie zu verstehen ; und sie nimmt mit zunehmendem Alter ständig zu. M. P. Eine Analyse der Korrelationen zwischen Einzelmenschen weist auf mindestens zwei den Tests zugrundeliegenden Faktoren hin ; der erste vertritt anscheinend einen allgemeinen Faktor der literarischen Würdigung ; der zweite zwei geringe und antithetische Neigungen, nämlich eine Vorliebe für einen mehr objektiven (oder " klassischen ") Stil und eine Vorliebe für einen subjektiveren (oder " romantischen ") Stil. Verwendet man Burts " Kriterium der Symmetrie," so entdeckt man, dass wesentlich dieselben Faktoren anderen Formen der ästhetischen Würdigung innewohnen, nämlich malerische und musikalische ; obgleich vom Unterricht stark beeinflussbar, scheinen sie in hohem Grade vom Temperament oder Typ abzuhangen. N. P. Sämtliche Tests weisen hohe Korrelationen mit der Intelligenz auf. Auch wenn man deren Einfluss beiseitesetzt, bleiben noch bedeutende Interkorrelationen zurück. Daraus darf man wohl schliessen, dass literarische Würdigung mindestens zum Teile ein besonderes Zeichen der Fähigkeit für die ästhetische Würdigung im allgemeinen ist.

A STUDY OF THE BEGINNINGS AND SIGNIFICANCE OF PLAY IN INFANCY.

By C. W. VALENTINE.

Part II.

V.—*Make-believe play from 1½ to 2½ years.*
VI.—*Main play activities from* 1 ; 6 *to* 3 ; 0.
VII.—*Play with novel sensations, emotions and impulses.*
VIII.—*Difficulties and dangers in the interpretation of play.*
IX.—*Symbolic and fantasy interpretation of play.*
X.—*Play therapy.*
XI.—*Summary.*

V.—Make-believe play from 1½ to 2½ years.

This is of course a common type of play among 3 and 4 year olds as the records of nursery school and other observers show ; but just as the daily observation of infants in the home discovered social play at a considerably earlier age than that reported in observations on groups of infants, so make-believe play was observed at a much earlier age in the intimate life of the family. I have already recorded of B that as early as 1 ; 0 he pretended to give his mother something in his hand when there was nothing there ; and Y fed her dolls with imaginary food at 0 ; 11½.

That great pioneer in infant psychology, Preyer, refers to his child at 1 ; 10 holding an empty cup to his mouth, sipping and swallowing. Preyer thinks that much of such supposed " imagination " is really due only to vague concepts—" cup " automatically suggests " drink " and " drink " " swallow "[1]. He seems to regard this action almost as one which would be called a " conditioned reflex " nowadays. But surely Preyer for once has gone astray. It is incredible that a child (e.g., B from 1 ; 0 to 1 ; 2) who repeatedly offered us imaginary gifts and received imaginary gifts from us (with no object there to suggest the action) confused the entire blank with some toy, or the imaginary " sweetie " with a real one. Besides the game is enjoyed as a pretence. I quote a note made at the time :

> B, 1 ; 0 held out his hand to us saying " Ta " as if about to give us something. I held out my hand and he pretended to put something in it, then drew away and laughed. This was repeated many times, and I also did it to him, he holding out his hand for the imaginary gift.

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[1] See *The Mind of the Child*, Pt. II, "The Development of the Intellect," p. 16.

Karl Bühler, in arguing that make-believe games at a later age are not really illusions, points out that a child will sometimes get a shock if a toy animal makes a noise by some hidden mechanism, as I myself have observed.[1]

Possibly some of the actions that I have recorded elsewhere as examples of imitation were also a form of " pretence play "[2]; both A and B for example at 1 ; 0 after watching me smoke would throw back the head and puff in a similar manner repeatedly. So did Sully's boy at 1 ; 4[3]. Also Y at 1 ; 2 would imitate our reading by putting her face close to a book and muttering softly.

Several other observers record make-believe play by about 1 ; 6 or even before. Miss Shinn's niece would pretend to be hurt in order to get a kiss at 1 ; 2 and at 1 ; 3 would bump her doll's head and bring it to be kissed. At 1 ; 8 she would offer her parents little sticks to eat.[4] Professor Dearborn's child at 1 ; 4 would show her dolls and pictures to other dolls[5] ; Sully's record of the boy who at 1 ; 6 seemed to pretend to be going away saying " ta-ta " and yet constantly returning, looks like pretence play[6].

Mrs. A. Thorburn at the end of her record of her daughter for the period of 1 ; 0—1 ; 6 says " the ability to pretend" showed itself occasionally in picking up imaginary articles and putting them in a box or taking from her mother's hair an imaginary hair slide and inserting it in her hair[7].

After 1 ; 6 pretence play becomes more frequent in the children observed. I append further notes :

B, at 1 ; 8 : Pretends to take drinks out of an empty cup between his bites of his food.

1 ; 10 : Plays a game with an imaginary ball—dropping it downstairs. Stoops to pick up the imaginary ball and goes through the action of throwing it down. This coincides with a period of special delight in watching my drawing of cats, trains, etc., on paper.

Plays games of imagination now. I dropped a safety pin and told him to look for it. He couldn't find it but repeatedly came to me with his hand closed saying " Ta " and pretending to put it in my hand. Later, when not allowed to have a cake, he reached to the empty cake tray and pretended to take a cake, putting it in his mouth and eating it and then saying " Good."

Sometimes the pretence was a means of teasing, thus :

B, 1 ; 9 : When put into bed, wanted to kiss a chair. When I held it up to him, he flung down in bed and pretended he was going to sleep. When I put chair down, up he sprang again. Had me on like this a long time, laughing hugely.

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[1] See his *Mental Development of Children*, p. 94.

[2] See the " Psychology of Imitation."—*Brit. Jour. of Psych.*, XXI (1930), p. 113.

[3] *Studies of Childhood*, p. 417.

[4] See her *Notes on the Development of a Child*, p. 153 and p. 227.

[5] See his *Moto-Sensory Development*, p. 162.

[6] See *Studies of Childhood*, p. 434. [7] See her *Child at Play*, p. 30.

Also at this period imitation of actions seen in pictures was active : for example a picture of someone running would set B off running violently up and down the room.

This impulse towards such simple imitation and make-believe play must be born in mind when interpreting play which may appear to express some fantasy or unconscious wish. Such interpretations seem unnecessary if there is such a strong tendency to act all sorts of activities seen.

A note on A shows that he too at this period (1 ; 8—1 ; 10) played such imaginative games as feeding his horse or pretending to eat his rusks out of an empty box. Also Y at 1 ; 11½ " Pours imaginary tea into her doll's teacups, puts in imaginary sugar and so forth." At 2 ; 1, " Takes imaginary chocolates from her pocket and hands them round." Mrs. Thorburn reports similar feeding of dolls with imaginary food during the period 1 ; 6 to 2 ; 0[1]. Vilhelm Rasmussen's little girl played similar games at 1 ; 8—letting her doll touch her father's coat, and then scolding and smacking it.[2]

A puzzling note of mine on B at 1 ; 10 either shows how far this kind of imagination can be stretched, or suggests a genuine bit of animism.

" B came to me to have his neck tickled this morning ; then ran to a chair and said " chair k - i - i - i " (tickle) touching first the chair and then his neck." He was apparently pretending that the chair was in some way being brought into the game. Rasmussen lists as " animism " the action of his little girl at 1 ; 11, in showing the pictures of birds to her Teddy-bear and asking it, " What is that ? " and adding to her mother, " The little bear sees."[3]

Stern reports his little girl of 2 ; 2½ as putting on her head a block of wood she played with as a ball and saying " lovely hat," and bandaging a healthy finger and saying " sore finger " ; also at 2 ; 7 symbolising a train by four chestnuts.[4] Sully reports that a boy " not yet two years old " pretended to paint the furniture with the dry end of a rope.[5] Major's child at the age of 2 ; 1 would feed dolls with a bottle and at 2 ; 5 roll up a piece of paper and play with it as a telephone.[6] Rasmussen's Ruth at 2 ; 3 played at " sweetshop," opening packets of imaginary sweets.[7]

Further notes need not be added as we have come to the period when such imaginative play is commonplace. Indeed it has been used by some psychologists as a test of development. Dr. Arnold Gesell notes such " dramatic play " as pretending to smoke or read in about three-quarters of the children at 2 ; 0, but only about a quarter or a third at 1 ; 6. Gesell regards dramatic play as having considerable development significance.[1] Dr. Charlotte Bühler gives a social element in fiction play (e.g., feeding a Teddy-bear and putting him to sleep) as a development test for the third year.[2]

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[1] *Child at Play*, p. 32. [2] *Diary of a Child's Life*, p. 44.
[3] *Ruth : Tagebuch über die Entwicklung eines Mädchens*, p. 25.
[4] *The Psychology of Early Childhood*, p. 269. [5] *Studies of Childhood*, p. 37.
[6] *First Steps in Mental Growth*, p. 234 and p. 237. [7] *Op. cit.*, p. 37.

Of course the right placing of a particular game at a characteristic year will depend on the nature and complexity of the game; thus Gesell puts the game of pretending to telephone for a doctor at the mental age level of 3 ; 0.[3] But some types of make-believe play as we have seen may appear soon after 1 ; 0 and became common by 1 ; 6 among the children here reported on. It must be recalled that the I.Q.'s of my own children ranged from 120 to 140; Miss Shinn's niece was almost certainly somewhat precocious, and so probably were several of the other children mentioned. Miss Shirley in her report on 25 infants observed says that imitative and dramatic play (e.g., playing at " being bears ") began about the period 1 ; 6--2 ; 0[4].

When comparing the dates of the first appearances one has not only individual differences to bear in mind, but the fact that early mental development is *intermittent*. This I noted in several different aspects—language, thought, motor-co-ordination and even reflexes. A function may reveal itself one day under very favourable conditions. Then a long interval of days or even weeks may lapse before it recurs. Then the intervals become shorter until the function is well established. Some examples of pretence play were no doubt overlooked, but in accordance with this principle of intermittence we should expect considerable intervals at first.

VI.—MAIN PLAY ACTIVITIES 1 ; 6 to 3 ; 0.

• Considerable space has been given to make-believe play because of its special psychological interest. If, however, we are to keep a proper sense of proportion in picturing the play characteristics of this period, it must be emphasised that a great part of the play continued to be of the type exemplified in the five minutes record made on B. at 1 ; 7, given in Part I of this paper (p. 199). More complicated bodily performances are practised—walking, running, jumping off a chair, etc. At 1 ; 8 B "enjoyed practising walking on a broad curb edging, for a long time." Climbing seemed to have a fascination for all the children (except perhaps one) about this age, and we allowed considerable freedom, while guarding against serious accidents. Thus, C would gladly climb alone to the top of a pair of household steps which were exceptionally high. Also

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[1] *The Mental Growth of the Pre-School Child*, p. 153.

[2] See C. BÜHLER and H. HETZER : *Testing Children's Development from Birth to School Age*, p. 145.

[3] *Op. cit.*, p. 153.

[4] *The First Two Years*, Vol. I, p. 145.

B at 1 ; 8 fell down half a flight of stairs—on his back : kept his head from bumping till the bottom. Screamed loudly for about half a minute. I took him from the nurse's arms, but at once he wanted to be put down and started climbing stairs again ! No fears here ! He fell through leaving go of banisters to hold something he was bringing to me. (A few days later) Jumps from couch repeatedly. Once he fell on his face and cried hard : but almost at once climbed up and jumped again. Hurt himself again but again persisted.

B, at 2 ; 8. Climbed up the banisters on the outside. (Miss Shinn also noted that her niece (about 2; 2) was " eager to do new and difficult things."[1])

Toys such as bricks are now more elaborately arranged, scribbling with a pencil (both right and left hand) developed, the possibilities of the piano were explored and so on. For example, notes on B's play at this period were :

1 ; 11 : Arranging bricks neatly in long straight lines.

2 ; 0 : Arranging bricks and toys in a design with a curve and a straight bisecting line. Building bricks into a tower decreasing in width towards the top.

Playing extreme bass notes on the piano, then extreme treble and so on as though comparing them.

The following is a list of toys or games found of special interest to B during the period 1 ; 6—2 ; 6 :

1 ; 8 : Stepping over bricks arranged in rows.

1 ; 9 : " Fishing " with a magnet and string.

1 ; 10 : Building with bricks. Looking at pictures. " Drill "—with stick behind shoulders. Imitating monkey walk.

1 ; 11 : Montessori geometrical insets and blocks. (A could do the cylinders at 1 ; 8.) 2 ; 0 : Ball for kicking. 2 ; 2 : Blackboard and chalk.

Y's favourite toys or games at this period we noted as : dolls and pram, digging in the garden, building with bricks, imitating reading and knitting, and many other imitations.

Joining in the various activities in the house of the mother, father and brothers or sisters were a constant form of play. With intellectual growth, there was playing at saying new words, at learning the names of animals on a set of animal bricks and picking the right ones out when the mother called out a name. Pictures afford increasing entertainment, even if one cannot strictly call this play. About 2 ; 0 B also loved to have pictures drawn for him and guess what they were, losing interest as soon as he had guessed, and then wanting another one.

The social aspect remains prominent. When there was a new baby while a child was between 2 ; 0 and 3 ; 0, doing things for the baby was usually a delight. Thus of one child at 2 ; 6 I wrote " Likes to stroke and kiss baby; to-day lay down beside him with his head on the same pillow, and said——(own name) go bi-bi." Any of the children would do almost anything with either father or mother for the sake of entertainment, especially if there was any novelty about it, for example my teaching them to do little gymnastic feats. About several of the children I have notes indicating that it made a marked difference to their signs of affection for me if I was able to find time to play with them a great deal for a day or two. Our eldest boy had rarely any slightly older children to play with ; but at 1 ; 9 he often played with a boy John (aged 2 ; 10) and I noted : "——is very subdued with John, doing everything that John tells him. He seems too interested in watching John to care about his own way."

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[1] See her *Notes*, p. 195.

Music was often the cause of delight in vigorous movement.

Thus B, at 1 ; 6 : Plays the piano, then dances to it, then plays again.

1 ; 8 : Seems to beat time now (sometimes correctly) with both hands when he hears a band or barrel-organ.

1 ; 9 : Waltzed round when I sang a lively tune this morning.

1 ; 10 : Danced spontaneously to sound of a funeral march (which I tried on purpose) played on the piano.

B dances even when he hears a man whistling.

Most of these forms of play had their special periods of popularity, just as we noted of the period round 1 ; 0. The most notable development in B's play in the two or three months after 2 ; 0 was his love of drawing with a pencil, including attempts at making triangles and circles which I had been drawing for him for the development of perception of form. He was sometimes pleased with his performances and he would worry me insistently to draw things for him at this time. (In general I may add that all the five children in these earliest years would practically always enter into the tests or experiments I did with them as a game, so glad were they to have me play with them.)

Rasmussen also noted the great frequency about 2 ; 4 of his daughter's playing at drawing, and also at making paper packets[1]. These periods of special concentration on a form of play are really I think another aspect of the love of novelty, the enjoyment of a capacity newly discovered or rapidly developing. Not that novelty is the only attraction of course ; some forms of play have so strong or so complex an appeal that they persist over years : but even when a particular form of play is almost " worked to death " for a time (the paradoxical phrase seems the only suitable one) there was a *relative* novelty about it—new possibilities were not exhausted, new skills were not yet *mastered.* This kind of thing lasted even through adolescence, when some new hobby would be taken up with enthusiasm, a great part of most days spent on it for several weeks of a holiday, and then the hobby suddenly dropped perhaps for ever.

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[1] See his *Ruth*, p. 38.

VII.—PLAY WITH NOVEL SENSATIONS OR EMOTIONS AND IMPULSES.

Such interest in the relatively novel is not confined to the bodily skills or new kinds of toys. Observations compelled me to conclude that it extended to new sensations and to maturing emotions and innate impulses. Thus *playing with a novel sensation* is suggested in a note on

> B, 1 ; 6½ : : In his playground he turns round and round singing, till suddenly he sits down with a flop and a little cry apparently of pleasure as though enjoying the sensation of giddiness.

Miss Shinn thought that her niece at 1 ; 2 was " experimenting with pain " when she played at pricking her finger with a pin[1]. From 1 ; 8 to 2 ; 6 and later, B and at least two of the other children, would love me to " play at lions " till they screamed apparently with fright—only to beg for it again. Here we seem to have *playing with a novel emotion.* At least a game is loved in which the excitement more than balances any inherently unpleasant emotion. Playing at fear in another way seemed to show in Y at 2 ; 3. E, the mother, said at dusk " Pull the curtains to." Y, " Oo - es-- dark, very dark," frowning and putting on a very anxious and fearsome expression. Sometimes she played with a more angry expression, shaking her curls, puffing out her cheeks and lips. I fancied here that there was an effort to experience the emotion by acting it, just as imitation of pictures seemed to serve as a means of fuller entering into the experience. In some of such playing with the unpleasant there may be, as Freud suggests there is in repeating an unpleasant experience, a vague attempt to gain a more thorough mastery over it.[2]

At 2 ; 0 a strange game of B's own devising seemed like *playing at assertiveness and contradiction.* When E asked " Does B love Mummie ? " B said emphatically " No." Then B said, " Daddie " ? and finally E gathered she had to ask " Does B love Daddie ? " B, " No."

Here surely there is revolt ! But No ! For B then indicated various favourite toys until E asked, " Does B love Pussy ? " B, " No," and so on B keeping on pointing out various objects in the room. This game was played several times in the course of a few days. Similarly Y at 2 ; 7 after contradicting E in something, asked her to say various things in order that she might contradict them. Mrs. Thorburn also states that her girl Mary between 2 ; 6 and 3 ; 0 thoroughly enjoyed a game which consisted of nothing but Nannie saying "No" and Mary shouting " Yes " a dozen or more times, both laughing[1]. These seem to me best understood as examples of early playing at assertiveness : as are many little acts in these early years in which a child pretends to disobey, often with a roguish smile, or running away laughing when told to " come here." Rasmussen also notes that his girl at 1 ; 8 found disobedience amusing. When discovered taking books from shelves though forbidden she laughed uproariously[2]. Similarly, B at 2 ; 3 " Screams with joy at getting hold of E's watch on her wrist, she pretending to be trying to stop him." Such romping teasing play seems to mark a transition to playing with the impulse of pugnacity or aggressiveness which seems involved in the rough romping or fighting play which appeared in this period. For example I would turn my back and pretend not to notice, while B (about 1 ; 8) approached and hit me ; when I shouted B would run shrieking to his mother, and then the same game would be played with the mother taking my place, though his playing at being afraid of her was only very half-hearted.

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[1] *Op. cit.*, p. 152.

[2] See *Beyond the Pleasure Principle*, pp. 15, 16.

Miss Shinn's niece from 1 ; 4 to 1 ; 9 enjoyed rough play—hitting and biting, all in good temper[3]. She was usually so jolly and full of fun that she gives us a specially good example of this playing at aggression. Thus at 1 ; 9 to 2 ; 0 she would slap the person holding her (in quite good temper) and once when lifted to say good night to her grandmother she snatched off her glasses and cap, threw them on the floor, did likewise to her grandfather, refused to kiss anyone good night as usual " laughing and romping instead."[4] At 3 ; 3 she explicitly said it was " good fun hitting Uncle Joe," and at the same age she stole round the family circle when all heads were bowed in prayer and gave each one a sound tap on the head with her spade !

Sometimes, however, what may appear to be such playing at a mood or emotion may really be dramatic play. Thus at 1 ; 9 B leaned against a wall and seriously pretended to cry (at nothing) and then held his horse against the wall and said " Gee-gee ky."

M. Etzioni in his study of nursery school children noted *playing at anger* for fun. The boy J.C. (2 ; 6) played with his doll, spanking it angrily, with a clouded face and clenched teeth[5]. He also gives several examples of playing at fighting which is of course a familiar phenomenon not only in children but in dogs, kittens and other animals. R. M. Yerkes reports that his chimpanzee "Chim" loved to play at fighting him, with teeth exposed and a fighting pose assumed. Yet that this was merely play he proved repeatedly by putting a finger in Chim's mouth without hurt, as one can often do with a dog playing at fighting[1].

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[1] *Child at Play*, p. 53. [2] *Diary of a Child's Life*, p. 28.
[3] See her *Notes*, p. 195. [4] Ibid.
[5] "A Method of Studying the Character Traits of the Pre-school Child."—*Jour. of Genetic Psych.*, Vol. 42, p. 191, 1933.

VIII.—DIFFICULTIES AND DANGERS IN THE INTERPRETATION OF PLAY.

In such examples of children's play just given (with strange sensations, unusual emotions, aggressiveness, etc.) there is usually an experience of a relatively novel kind, and in many cases there is also the expression in a restrained form of a fundamental impulse. It seems, however, quite unnecessary to surmise that the aggressive play of B when he hit me and ran away (as he did at 1 ; 8), or that of Miss Shinn's niece, just quoted, was really an expression of a half-repressed specific antagonism against the person concerned. Miss Shinn's niece, for example, showed similar delight at the same period (1 ; 8) in romping with a big dog, pulling his hair and tail, clutching him roughly and teasing him so that he snapped at her[2]. Another factor that must be borne in mind in attempts to interpret the play of an infant is the child's *tendency to indulge in pure nonsense.* Things may be said and done which have no rhyme or reason, as indeed happens even among adults. An idea comes through verbal associations say : in an adult it leads to a feeble pun, in a child it may run as follows :

> After a period of a few days in which I had been drawing for B some figures and teaching him to draw a triangle and a circle, I then drew a tiger for B and said that it was going to eat a little boy. B then drew a triangle and said *that* was going to eat the little boy.

An element of absurdity of course enters into much of the dramatic play of the period. Thus Y, at 2 ; 6, long before she went to school, when playing one day in the nursery, suddenly looked at the clock, which she could not understand, and said, " Oh dear it is 10 o'clock, I must go to school."[3]

From 2 ; 6 onwards " pretence play " was frequent. But it seems unnecessary to suppose that the pretence games must always have some hidden significance. Something must be done ; and often the impulse to imitate determines what. For example both B and Y in the same period would still frequently pretend to read aloud with a book open in front of them. It is easy to read a subtle meaning into play unnecessarily. The note already quoted on B at 1 ; 0 when he gave me an imaginary object and laughed, might have been interpreted as a first enjoyment of assertiveness and scoring off the father. But it also happened that B also played at *my* giving *him* an imaginary object : and he and Y offered imaginary food to their animals and dolls. In interpreting play as symbolic one must also remember that a very young child will make almost any thing do to represent anything else. A note on B. at 2 ; 7 describes an elaborate game in which strips of paper stood for beans ; a pan in which they were cooked was placed on a fire which was represented by the blankets being piled up.

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[1] See *Chimpanzee Intelligence* by R. M. YERKES and B. W. LEARNED, p. 31 (Baltimore, 1925).

[2] *Op. cit.*, p. 194.

[3] Dr. Lowenfeld gives some excellent examples of the enjoyment of nonsense play at later ages in the chapter on " The Comic Element in Play " in her book *Play in Childhood.*

In view of the almost everyday occurrences of such pretence games, in which the simplest processes are played at in an imaginative way and often with sheer tomfoolery, it seems unnecessary to conclude that when my younger girl at 2 ; 7 pretended her knitting needles were knives and cut imaginary slices of meat from her sister's knee and handed them round to each of us that she had repressed cannibalistic tendencies !

There are no doubt many games in which genuine innate impulses are partially expressed. I have already given examples of play at aggression and fighting : and the apparent tenderness and affection in handling dolls which both my daughters (in common with most girls) showed from about 2 ; 0 onwards, suggested that the maternal instinct was just budding and expressing itself thus. The dolls would be ill and have to be nursed and petted, the girls would call themselves " mummy " and so on. In such an example as the knee carving just given it appeared on the other hand that the absurdity of the play was the thing.

As generally agreed the playful indulgence in various innate tendences is not a replica of the real thing. There is a restraint in playful pugnacious behaviour ; there is rivalry rather than a real desire to hurt[1]. Of course when there is a real motive for aggression it may appear in the midst of play without being a part of the play. Even the affectionate and good tempered Y (who was so tender to her dolls and to all other animals) when playing at 2 ; 9 with a boy of 2 ; 3 began to struggle with him for the possession of his go-cart, shouting " I want it."

In McDougall's discussion of play, he refers to the typical fighting play of dogs in which they carefully avoid hurting one another. This and other types of play lead him to the view that such play is not really the aggressive instinct " at work (or at play) "[2] but merely " the primal libido or vital energy flowing not in the channels of instinct but overflowing, generating a vague appetite for movement and finding an outlet in any or all of the motor mechanisms in turn ".[1]

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[1] In his *Social Psychology* (Ninth edit., pp. 110 ff) McDougall approves of F. H. Bradley's references to restraint in playing, in the latter's article in *Mind*, Vol. XV.
[2] *Outline of Psychology*, p. 171.

This seems to me to be a much more accurate view of infantile play than that which regards such play as a constant clue to strong innate but repressed or other unconscious tendencies. Yet it does not seem to account for the form in which these motor activities appear at times, for example play in which very little movement (e.g., of the fingers only) is involved; and in the case of the child running away from the lion it is surely not merely the movement that he seeks, but also the excitement and emotion. In playing with her dolls the little girl seems to enjoy not only the outward procedure of looking after them, but the very emotion of tenderness—some satisfaction of the dawning parental instinct.[2]

In some play activities it certainly looks as though the dawning instinct causes the initiative to take place in the child, even in the absence of an appropriate stimulus: the boy hits at a friend without provocation, and the girl waxes sentimental over a most unprepossessing rag doll. In both there is, however, the realisation that it is not real; the boy's pugnacity is restrained. For real anger and fighting objectional resistance and annoyance is necessary. Sometimes indeed the borderline of play and reality are hard to define, as in the following report by one of my students on the evidence of pugnacity in her own childhood. She said that for several years, from 3 ; 0 upwards, she would usually be exceedingly obedient, obeying her parents' slightest wishes. " Then suddenly one day I would refuse to do what I had been told. I would not get up for half an hour when mother lifted me out and told me to dress. I continued to sit through a cold winter morning. Later I was whipped, but no repentance followed. Then I was good for some weeks and then came another fit. I was naughty for the sheer joy of fight."

This report, which greatly resembles that of Miss Shinn's niece, and which is supported by similar reports that one of my own children has given me of memories of earlier years, has a bearing on the threat of old-fashioned mothers that if a child did not stop crying they would give it something to cry for !

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[1] *Op. cit.*, p. 172.

[2] Professor Burt thinks that, though some sentences of McDougall do suggest that he regards the enjoyment of play as pleasure in exercising motor mechanisms, yet he (McDougall) would regard it as an emotional activity (though not due to a specific instinct) and would accept my interpretations given above. The main difference between the two views does seem to be exemplified by McDougall's statement (page 172) that a child, in playing at ghosts, " seeks the added energy and zest given by the element of fear," whereas I have suggested that such an emotion may be played with as a novel experience. The difference, however, may not be great.

On the other hand the important truth in McDougall's view is one which is overlooked by some interpretations of play. We cannot assume that the specific form which the play takes implies a strong specific desire which craves for satisfaction. For example at 2 ; 8 Y would sometimes play at being someone else—e.g., " Mrs. Jones " with her baby doll. Now a child playing at being her mother has been interpreted by psycho-analysts as meaning that the little child wanted to replace her mother in the affections of her father. But the explanation seems hardly necessary when a child will play as Y did as being an unknown Mrs. Jones. At different times Y would also call herself various names of nobody in particular, insisting for a period (of perhaps a few days) on being called by that name.

Even when, as often no doubt happens, imagination or dramatic play is a means of entering more fully into some imagined experience, we cannot infer that it always implies a strong urge which craves for satisfaction. The clearest indication of this is the fact that children often play at being a horse (and not always a horse plus rider, but a horse driven by someone else), or an engine, or a motor-car[1]. Even when human beings are represented no fundamental urge seems to be necessary. For example the interest in watching a coalheaver at work was enough to make a boy of 3½ years represent the character for a whole day, refuse to respond to any other name, and at night pray to be made a good coalheaver ! [2] Some psycho-analysts' explanations of fantasy play seem to me to lack that touch of imagination, and at times of humour, which children so interpreted themselves reveal[3].

No doubt in much play in which human characters are acted, some impulse is satisfied, as when the older boy plays at being a schoolmaster or " father " and domineers over others, and when the girl plays at being " mother " to her dolls or younger playmates. I asked one of my children of 10 years, " Why do you like playing at being a school teacher ? " The reply came at once, " Because I like bossing people about : I want to be a school teacher." So the satisfaction can be quite a conscious one at 10 years.

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[1] Of course some psycho-analysts, using some scores of symbols of sex, would bring many of these games under the heading of the satisfaction of unconscious desires. This will be referred to later.

[2] See J. SULLY's *Studies of Childhood*, p. 38.

[3] I should like to quote a remark by Professor Burt on this paragraph : " Take a child trying to draw a picture of a man. His fifth or sixth effort may be so queer that he breaks into loud laughter at it. Surely it would be absurd to say with the psycho-analyst that the child's unconscious mind was deliberately trying to caricature his father in order to express his pent-up hatred. The implicit argument seems to be that the young child at this age ought to be perfectly rational in his thoughts and in his actions, and if he is not rational then he has deliberately deserted the paths of reason under the influence of some secret desire."

Sir Percy Nunn regards the child's habit of make-believe as " a biological device to secure that his self-assertion during the formative years of life should not be frustrated by his inability to control the real conditions of his activities."[1] This seems to me to contain a valuable suggestion and to be broadly true so far as it goes. It seems, however, that we must also regard the various forms which play takes as the consequence of the growth—the emergence into an active insurgent form—of mental capacities which crave for activity for their own sakes, as in intellectual constructive work; or as the emergence of impulses which crave for some satisfaction even in play. Whether all such imaginative play is biologically valuable seems to me to be a matter of surmise rather than proof. There seem to be some human and animal activities which are of little biological value, which appear rather to be side products, as it were, of evolution[2].

Play with bodily activities leading to skilled actions, and with speech, certainly serves as a valuable part of the learning process. Playing with a doll however does not teach a girl much about how to bring up her offspring, though the expression of various impulses in such imaginative play may possibly be of some value in the healthy mental development of the child. We seem, however, to have no adequate grounds for urging the child to make-believe play and certainly none for discouraging it. Our study of infant play is consistent with the view stated by Nunn, that " Froebelian practice errs where it introduces make-believe play gratuitously, that is where the child's spontaneity does not need its aid, and the Montessorians err in refusing that aid where it would serve to widen the child's range of serious interests and achievements."[3]

I would only make the proviso that, as much of children's imaginative play is following the suggestions of other children, there would seem to be no more harm in the suggestion coming from an adult.

IX.—SYMBOLIC AND FANTASY INTERPRETATIONS OF PLAY.

After his well-known eulogy of the ball as a " talisman " and " moral safeguard " Froebel wisely goes on to say that it avoids the awakening of other desires by providing occupation, and it encourages activity. If we add that it gives an opportunity of exercising various kinds of skill and of competitive games, it seems unnecessary to suggest that the ball is delighted in (unconsciously) as a sex symbol, thus accounting for the great popularity of ball games! The fact that it is the only shape with which an object will move easily and rapidly along the ground so that it can be chased, and also can pass rapidly from one child to another and so on, is surely enough to explain its special popularity. (Incidentally if ball games are chiefly dependent on sex symbolism for their popularity, why is it that Rugby seems less popular with the masses than Association football, seeing that the Rugby ball seems the more accurate symbol, except to the expert anatomist?)

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[1] See *Education: its data and first principles*. Revised Edition, p. 95.

[2] [illegible] t this is true occasionally of laughter, in the article on " La [illegible] du Rire " in the *Journal de Psychologie*, XXXIII, 1936.

[3] [illegible]

Play with water has also been regarded as profoundly significant because of its relationship to two natural needs of the child. Hence play with water is apt to be regarded as symbolic. A girl, it is asserted, may enjoy squirting it through a syringe as a substitute for the organ which she lacks. But surely water is a unique kind of plaything. So many things can be done with it that cannot be done with anything else; and is quicksilver any the less popular a plaything when it is available?[1]

A plasticine model of a man which a boy makes and breaks up is sometimes taken to symbolise the father whom he hates and in his fancy destroys—especially if it is known that he hates his father already: such play is regarded as a release of repressions. No doubt as said above, in the case of the dramatic play at about 3; 0 or 4; 0 or more, the children enjoy a feeling of superiority when playing "mother" or "teacher" and successful pugnacity may conceivably be enjoyed even with a fight with inanimate leaden soldiers, as it is when a man who is angry finds relief in smashing something. But it does need to be stressed that the healthy alert child is constantly doing things, playing with every object that comes within his reach (beginning as a mere baby with every part of his body—fingers, nose, ear, toes, hair, as well as genitals) and later indulging in every game of movement—bumping, running, bending down, jumping, climbing stairs (a sex dream symbol); so that he is bound in time to include many activities that might be interpreted as symbolic—especially as we find over a score of objects claimed as symbols of the male sex organs and even more of the female[2].

Consider also the following records of the play of the young ape brought up by Professor Kellogg:

> She would sometimes place a blanket or clothing over her shoulders and drag it round with her. She would put small branches containing foliage upon her back and similarly carry or trail them; or she would wrap herself in hanging tree moss or in rags by putting them behind her back and holding

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[1] Dr. Lowenfeld herself gives a long list of the varied things which can be done with water as a plaything in her book, *Play in Childhood*, p. 121.

[2] A list has been collected by Dr. C. S. Myers and given in the chapter on Freudian Psychology in his book *A Psychologist's Point of View*, p. 111.

them with both hands in front. She would thereupon walk upright with a train following in her wake, towards which she would gaze with a playful smile, moving usually in a wide circle as she did so.[1]

Surely a sign of coyness or consciousness of sex some might say if Gua had been human ; instead of which it may have been an imitation of human clothes, as similar play of a little girl might well be, or a form of play developed from random throwing things (e.g., unwanted food) over the shoulder.[2]

The tendency to bite things at the first appearance of teeth has been referred to as a " quasi-destructive instinct "—and described as " oral-sadism." It may be destructive in its effects : but the tendency to practise any new capacity can, I suggest, account for all the biting (which is chiefly of inanimate objects) which is not already accounted for by the great comfort gained to teething gums, which welcomes a finger or a rubber ring impartially.

Further, in the view of the way in which we have seen that imaginative play may satisfy emerging impulses and interests, we may regard as not only gratuitous but fantastic, the statement that the little girl plays with her doll as a means of reassurance, her dolls providing a " proof that she has not been robbed of her children by her mother, that she has not had her body destroyed by her and that she is able to have children."[3] Incidentally such an interpretation does not seem easily reconcilable with Mrs. Klein's own sweeping generalisation that the whole of children's play is based on *masturbation* fantasies[4] ; and that generalisation itself is hard to reconcile with such facts, repeatedly observable in infants' play as we have seen, of the delight in new activities and new toys, of play in speech as well as with other skills, or with the rapid change in a game through imitation of others, and the great influence of recent experiences in determining play, the last a very important factor in the play of somewhat older children (5–7) as shown by recent records by one of my own research students, Miss E. Hall, on groups of infant school children.

Again, to one who has watched the play of infants from their earliest months and seen all their playful activities and their meaningless movements, their practice with all kinds of sounds, and later with words, their capability of representing almost anything by almost anything else, of imagining a cake which an imaginary friend eats, and of pretending there is tea in a cup and pouring it out for a doll, the idea of requiring a psychoanalytic interpretation of the following type for a child's play is strange.

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[1] *The Ape and the Child*, by W. N. and L. A. KELLOGG, p. 120. (New York, 1938.)

[2] The latter interpretation is suggested by Professor Burt.

[3] M. KLEIN : *The Psycho-Analysis of Children*, p. 253.

[4] *Op. cit.*, p. 162.

A boy of 2 ; 7 in his bath plays with his toy duck. Then he " puts it in the bath near the plug hole, saying " Duck want wee. Duck wee in hole. Duck have penis." " I asked him " (writes the mother) " which was the duck's penis and he pointed to a place on its underside and said " penis dere," but there was nothing like a penis there." Mrs. Isaacs interprets this as " Denial of castration anxiety "[1].

A record by Dr. Lowenfeld supplies an admirable parallel.

> E.J. (3 ; 6) : Playing with plasticine ; her idea was to make " pies " and " puddings." She told me to make several things, and insisted that a little boy in plasticine should have teeth and a tongue.[2]

Must we interpret this as a denial of tooth and tongue extraction phobia ?

It should be added that Dr. Isaacs holds that the symbolic value of play is not the sole value of play for the child. There is always, she says, the conscious and the unconscious value. She adds, however, that when a child of, say 1 ; 6, spends " a large part of his waking time fitting things together, there can be no doubt that the cognitive activity, although present, is at a minimum."[3]

But if the conscious value seems to provide an adequate interpretation why read into it anything further ? The assertion that there is any unconscious value must be based on entirely different evidence, particularly the psycho-analysis of the child. " The psycho-analysis of young children," she writes, " by Klein's play technique has shown that engines and motors and fires and lights and water and mud and animals have a profoundly symbolic meaning for them rooted in infantile phantasy."[4]

A general discussion of the interpretation of actions of children by reference to the unconscious is of course impossible here : it would involve a lengthy consideration of the reference back to childhood of adult experiences (a point which personally I do not regard as essential for the retention of the main values in Freud's contributions to the psychology of the unconscious).[5]

But we may briefly examine a sample of Mrs. Klein's technique to which Dr. Isaacs refers. In dealing with a difficult child Mrs. Klein apparently regards it as evidence of the truth of her interpretation (to the child of its play) if a child becomes friendly and trustful afterwards[1]. Now a little girl, Trude (3; 9), when she first came for analysis was "full of anxiety and ill-will." She wanted the flowers taken out of a vase, and in her play she "threw a little toy man out of a cart into which she had previously put him, and heaped abuse on him." Mrs. Klein states that her "immediate interpretation," given to the child, of this and other things "in the sense that she desired to do away with her father's penis, because it was playing havoc with her mother (as represented by the vase and the cart . . . .) at once diminished her anxiety, and she left me in a much more friendly mood than she had come and said at home that she would like to come back to me "[2].

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[1] *Social Development in Young Children*, p. 462.

[2] *Play in Childhood*, p. 110.

[3] *Social Development in Young Children*, p. 211.

[4] *Op. cit.*, p. 210.

[5] The reference back to childhood of adult neuroses depends partly on views as to infantile sexuality, the attitude to parents and the Oedipus complex which I hope to discuss shortly in a book on the psychology of infancy. McDougall gives reasons for accepting much of Freud's doctrine, and yet rejecting that of the Oedipus complex in his *Outlines of Abnormal Psychology*, Chap. 25, and in his *Psycho-analysis and Social Psychology*, 1936, especially Appendix IV.

But of course! Who had ever told her such entertaining fairy stories? And when the kinds of troublesome behaviour are known beforehand how easy it is to see analogies between the play and the psycho-analytic interpretation of such behaviour. The phrase "analysis showed" is often repeated, but this seems usually to mean that such analogies were seen by the analyst and interpretated to the child. Such kind of evidence seems to me most untrustworthy[3].

As a result of her treatment of problem children without such psycho-analytic interpretation, Dr. Lowenfeld bluntly states that the "dire results of non-interpretation on psycho-analytic lines" suggested by Mrs. Klein have "not been found to occur "[4].

X.—PLAY-THERAPY.

A paper on the significance of play in infancy cannot omit all reference to the recent ideas and practices in play-therapy, some of which are not in accord with psycho-analytic views. Play-therapy is used in some of our Child Guidance clinics and institutes. One main idea is that the undesirable behaviour in the child may be expressed in play form and so eliminated. Some hold that the children must be told the real significance of their play: As one play therapist put it to me, "If a boy is aggressive towards his mother, and in the clinic hits a doll, he must be told that it is really his mother that he is hitting and wants to hit, and only then will it cure him." The head of one of our leading clinics however writes, "Some times the psychiatrist must interpret to the child the meaning of his play.

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[1] See her remarks on the girl Rita, in her book *The Psycho-Analysis of Children*, p. 47. [2] Ibid.

[3] It must not, of course, be taken that Mrs. Klein's methods or ideas are approved by all psycho-analysts.

[4] See *Proceedings of the Child Guidance Inter-Clinic Conference of Great Britain*, 1937, p. 28.

The value of this however seems to be doubtful and interpretation is often unadvisable and harmful "[1].

It is difficult to find any conclusive evidence for this specific value of play. Of course if one approaches the question convinced (*a*) that any persistent type of play always expresses some conflict or problem, and (*b*) that the expression in play must release any repression and resolve the conflict, that is no doubt enough. But for those not already convinced of these propositions, more objective evidence is needed.

The general value of congenial play in the development of the child is of course not questioned. Its value for health and happiness are obvious; and it is possible that it may serve as a stabiliser of nascent impulses and emotions. For example, as I have already suggested, though play with dolls teaches a girl very little about how to deal with a baby, the expression in such play of her own feelings may be of value to her development. Dr. Lowenfeld's summarised conclusions as to the functions of play, given at the end of her book (p. 324), seem to me to be substantially sound, though I should put her (*d*) " Relaxation and Amusement " second in importance if not first, except for infants; and I demur to her distinction between (*a*) the child's consciousness, and (*b*) his " emotional experience," the two " needing a bridge " : surely (*b*) is a part of (*a*).

What seems to me to be more doubtful is whether violent aggressiveness say towards a father, or problems of bodily uncleanliness and various neuroses can be resolved by specific forms of play. Dr. Lowenfeld's more detailed account of her therapeutic methods,[2] while full of interest and marked by great candour, affords little evidence of the value of specific forms of play.

In some cases she describes, the improvement takes place more rapidly when the child is away from the clinic and home on holiday (see top of p. 215 and bottom of p. 213). In some cases the length of time of the treatment gives a chance for mere maturation to have its effect. Many normal children pass through short phases of difficulty of various kinds which disappear without special play treatment.[3] Again, when the mother is " temperamentally irritable with children " and " weepy "—as was

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[1] Dr. Moodie in the Report on the London Child Guidance Clinic for 1932-33, p. 8.

[2] See a " New Approach to the Problems of Psycho-Neurosis in Childhood, *Brit. Journal of Medical Psych.*, XI, 1931. It should be mentioned that Dr. Lowenfeld says that she is " unable to accept Mrs. Klein's description of non-analytic play." (*Proceedings of Child Guidance Inter-Clinic Conference*, p. 27.)

[3] The records of K. Bridges and other observers of " pre-school " children afford examples of these. I noted such phases in at least three of my own children. I imagine most teachers who have had infants under their charge for several years would regard this fact as commonplace. As to the time factor, some of Dr. Lowenfeld's children attended the clinic for the greater part of a year, and some of Mrs. Klein's children paid between 200 and 300 visits to her.

Eric C's—then merely to be away from his mother and with calm friendly people might do much.

Then there is the possible influence of any improvement in physical health while attending the clinic. Dr. Lowenfeld states that some physical conditions can " themselves produce the whole phenomena of neurosis " (p. 196). Other general influences will be mentioned shortly.

It would seem well to await more exact information based on a comparison of the proportion of cases in the clinics permanently cured by this method as compared with the proportion cured in clinics not using this method. It is no proof to say that this method has cured some children not cured by previous treatment, because the time factor is admittedly important. One clinic director indeed told me that some of his cases on the waiting list were reported as satisfactorily adjusted before they could be taken at the clinic. One is reminded of Janet's statement that there are certain forms of nervous diseases which will take their course, whatever is done, and then disappear. "Happy," he adds, "the physician into whose hands the patient falls when she is about to recover ! " Dr. R. B. Cattell states that when " various objective investigations " had been made of the effects of treatment on psycho-analytic or Adlerian lines "it had sometimes been found that the recovery rates of the treated and untreated groups were regrettably similar "[1]

When improvement does follow this or indeed any method, it is possible that it is due merely to the fact that the child finds an unwontedly friendly atmosphere, a patient and sympathetic adult, perhaps for the first time in his experience ; and that he can spend much time in playing with delightful toys. (The " World " cabinet is indeed a marvellous plaything.) Mere removal most or part of the day from the personality (parent or sibling) with whom has been the trouble may be itself enough—as it is with some adults who " get on one another's nerves." This, with the addition of calm, sympathetic, kindly treatment may be everything. Dr. Lowenfeld may well owe her clinical results chiefly to a charming personality and a winsome way with children—and so may Dr. Isaacs and other child-analysts. The effect of suggestion too, by an individual who wins a child's affection, is often greatly underestimated or even ignored in discussions of both play-therapy and psycho-analytic treatment. The influence of suggestion looks especially likely in those cases in which improvement at the clinic is not accompanied by improvement at home. (*See* Dr. Lowenfeld's article, p. 205 and p. 215.)

Of Dr. Lowenfeld's patients, Susie (age 3 ; 4), whose case is described on pp. 219-224, is perhaps the nearest to an example of a marked change after a specifically adapted kind of play. Dr. Lowenfeld for 25 minutes patiently built up rows of bricks which Susie knocked down, finally running to her mother in tears. From then progress was rapid. Yet even here the strongest impression one gets is one of Dr. Lowenfeld's great tenderness and patience with difficult children. As she herself says: "The slightest feeling in oneself of . . . . irritation . . . . or impatience or lack of friendliness, and the frail bridge is broken" (p. 224).

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[1] *Proceedings of the Child Guidance Inter-Clinic Conference*, 1937, p. 55.

Furthermore the change in Susie was this: "the centre of interest was shifted from aggression to what Susie was and was not a big enough girl to do." Had this suggestion not been put to her? Certainly I have found, as I imagine many parents and teachers have found, that at the right stage, such a suggestion may make a most effective appeal.

Finally, even if it were proved that, in such abnormal children as are likely to be dealt with by Mrs. Klein and other analysts or by play-therapists, some play activities symbolise unconscious sex or other conflicts, it does not follow that the same would be true for the great majority of children. The chopping up of human figures made of plasticine, for example, which some psycho-analysts discuss, was found to be almost absent in the free play of two groups of infants (over fifty in all) observed by one of my research students, Miss E. Hall,[1] but they were over 5; 0. Yet there is a frequent tendency in semi-popular books on child psychology, to slip almost imperceptibly from statements about problem children to the needs and treatment of more normal children: so that parents and teachers are apt to interpret the most innocent actions as profoundly significant of some present or future trouble unless special care be taken, and an attitude of excessive anxiety and fussiness may be aroused. Furthermore, a reaction against child-psychology is to be feared if hypotheses which have been announced as dogmas are proved untenable, especially if it appears that familiarity with ordinary children should have made that clear all along.

XI.—Summary.

It is difficult to make a summary of a paper like this, but a few of the main points may be listed:

(1) If one takes play to be activity engaged in for its own sake, play seems to begin in some infants by about 0; 3 or 0; 4, in the repetition of movements found agreeable; about 0; 6 appeared enjoyment in the constant repetition of a few speech sounds.

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[1] The comparative study of the play of normal and problem children of the same age with similar material and under similar conditions of freedom is, I think, a promising line of research.

(2) A social aspect in play may appear about 0 ; 6. Early appearances of social play depend on familiarity with the persons played with.

(3) New activities of many kinds are delighted in, sometimes even if very difficult; such activities may be constantly repeated for a time.

(4) Play with imaginary objects may begin at least by 1 ; 0.

(5) From early in the second year play may often be determined by imitation of other children.

(6) Make-believe play, in the infants studied, was prominent from the second year on. All sorts of everyday activities are imitated in make-believe play.

(7) From 1 ; 6 to 3 ; 0 constant play with new performances continued, many of these having a period of special interest and activity.

(8) Not only new bodily activities but relatively novel sensations, emotions and impulses seem to be played with, e.g., the sensation of giddiness, the impulse of pugnacity or aggression, the emotions of fear and anger.

(9) In attempting to interpret the play of infants one must bear in mind the love of nonsense or tomfoolery, and the wide range of many play activities.

(10) The evidence for the symbolic interpretation of play-activities along psycho-analytic lines seems to be very doubtful. Often it appears to be based on coincidences between a type of play and known troubles of the child ; or on an interpretation of the play based on sex-symbols, which are so numerous as to be bound to occur constantly in children's play. Play activities of the type usually quoted are capable of more reasonable interpretations.

(11) As yet there seems to be no satisfactory statistical evidence that either the psycho-analytic interpretation of their play to children or play-therapy of a specific type is more beneficial to "problem children" than friendly treatment in a place removed from the source of their troubles. Many of the supposed cures may be due merely to maturation under such conditions.

I should like to express my warm gratitude to my colleague on the Editorial Board, Professor Cyril Burt, for his careful reading of this paper, and for some exceedingly helpful comments.

I also wish to take this opportunity of thanking the Trustees of the Leverhulme Research Fellowship Fund for a grant which provided me with leisure to collate observations made, during a period of over twenty years, on my own and other children. This paper is one small part of that work.

RÉSUMÉ.

UNE ÉTUDE DES COMMENCEMENTS ET DE LA SIGNIFICATION DU JEU DANS LA PREMIÈRE ENFANCE.

Cet article est basé principalement sur les observations faites par l'auteur sur ses cinq enfants, avec une considération comparative des rapports d'autres observateurs. Il décrit le jeu des premiers mois, les commencements du jeu social (avant 12 mois), et la joie produite par des activités nouvelles. Une autre section traite du jeu imaginatif (de 1½ ans à 2½ ans) et l'on cite des témoignages d'un genre de jeu comportant des sensations nouvelles et des émotions et impulsions. L'on prétend que l'interprétation du jeu enfantin comme symbole des idées sous-conscientes, ou des impulsions reprimées, est superflue, et qu'elle est souvent contradictorie aux faits. L'on démontre que le témoignage en faveur des idees, psychanalytiques et autres, que présuppose ordinairement le traitement par le jeu est insuffisant, et l'on maintient que les guérisons dans les cliniques, attribuées aux jeux adaptés exprès aux conflits de l'enfant, peuvent s'expliquer autrement.

ZUSAMMENFASSUNG.

EINE UNTERSUCHUNG DER ANFÄNGE UND DER BEDEUTUNG DES SPIELES IN DER KINDHEIT.

Diese Abhandlung hat zur Grundlage hauptsächlich die Beobachtungen des Verfassers über seine eigenen fünf Kinder zusammen mit einer vergleichenden Behandlung der Aufzeichnungen anderer Beobachter. Sie beschreibt das Spiel der frühesten Monate, die Anfänge des Gemeinschaftsspiels, und die Freude an neuen Tätigkeiten. Ein späterer Abschnitt befasst sich mit dem Rollenspiel (vom 1 1/2 bis zum 2 1/2 Lj.), und es werden Beweise gegeben vom Spiel mit neuen Eindrücken und mit Gemütsbewegungen und Trieben. Man führt Gründe dafür an, dass die Ausdeutung des kindlichen Spieles als Symbol der unbewussten Ideen oder unterdrückten Triebe unnötig ist und oft mit den Tatsachen nicht übereinstimmt. Man weist auf die Unzulänglichkeit der Beweise von psychoanalytischen und anderen der Spieltherapie gewöhnlich zugrundeliegenden Ideen hin, und es wird die Meinung vertreten, dass die Heilungen, die die Kliniken dem Spiel zuschreiben, das den kindlichen Konflikten besonders angepasst sein soll, anders erklärt werden können.

THE HANDICAP OF DEAFNESS.

By IRENE R. EWING and ALEX. W. G. EWING. (Longmans, Green and Co. 12s. 6d.)

On most of the problems connected with the alleviation of deafness, apart from those of prevention and treatment which are properly the province of medicine and surgery, this book is undoubtedly the leading authority, and is likely to remain so for many years to come.

So far as I know, nothing of so comprehensive a nature has been published anywhere. It is encyclopædic in scope: and is comparable in its own sphere with R. T. Beatty's *Hearing in Man and Animals*, in that it brings within the covers of one volume the results of a wide range of work by many people, a great deal of which has hitherto been accessible only with difficulty. A good deal of the ground has already been covered by the authors (and Dr. T. S. Littler) in previous publications concerning their researches. The present book marshals this earlier work in orderly fashion, and contains also a good deal of hitherto unpublished research.

As already indicated the scope of the book is wide. To quote the operning words of the authors, " . . . its aim is practical. It is intended to be a working source of information to all who are unfortunate enough to suffer from defects of hearing, as well as to professional wörkers who serve the deaf. Amongst these latter must be numbered those responsible for advising patients diagnosed as suffering from chronic or progressive deafness: those upon whom it falls to detect deafness in children, to decide the place and manner of their education: those who teach the deaf: those who organise and carry on welfare work among the deaf, the hard-of-hearing and the deaf-blind." How splendidly the authors have fulfilled their aim can be judged only from a detailed study of the book: but properly to appreciate its value some knowledge of the circumstances that have led to its production is necessary.

In 1919 Sir James E. Jones of Rochdale (to whose memory and that of his son the book is dedicated), in addition to other substantial benefactions for the deaf, made possible by his generosity the foundation of a department in the Victoria University of Manchester for training teachers of the deaf. The scope of the department has expanded greatly, until now, as the Department of Education of the Deaf, it is engaged not only in training specialist teachers, but is occupied with continuous research upon very varied problems concerning the deaf, and administers a clinic where both adults and children handicapped by deafness may obtain expert advice and assistance. The Department and its work are unique, at least within Europe, and patients are referred for help and advice from all parts of the British Isles.

In 1930 Dr. Ewing published his book on *Aphasia in Children*, which is really the foundation of all the subsequent work that has led to the production of the present volume. His object then was to discover why certain children, possessed apparently of considerable hearing, did not learn to speak by natural means. The investigation was brilliantly successful and has led directly to all the recent activity concerning the utilisation of remnants of hearing.

In 1932 Dr. and Mrs. Ewing were joined by T. S. Littler, a specialist particularly in the physics of sound, whose advent, to those in close touch with the work, has seemed like a direct act of providence. He has been responsible for all the technical work in the researches: and as the authors state, he has done outstanding service to the deaf.

Since then, the team, with their numerous helpers, have worked unceasingly at all manner of problems relating to deafness and the deaf: and whilst the value of their work can be realised fully only by a specialist in close touch with those problems, even the layman will appreciate something at least of the wide diversity of the researches and of their worth—and something, too, of the burning enthusiasm which animates the team and all their helpers.

To an adult who has enjoyed a lifetime of hearing (and through hearing has acquired both speech and English) the advent of deafness, whether slow and insidious or devastatingly sudden, is apt to induce a feeling of despair. Its ill effects, intellectually, socially, spiritually, are well-nigh beyond conception. To such a sufferer this book is a banner of hope. Means are at hand to mitigate, if not entirely to remove, his handicap. As the authors say, " To-day there is help of one form or another at hand for any deaf person who is prepared to exert himself to obtain it, and whose friends are willing to co-operate with him in his search." If the sufferer will come half-way the experts will do the rest.

The earlier chapters of the book examine thoroughly the intellectual and social effects of adult deafness and show how the sufferer can be helped. The haphazard purchase of expensive (and often useless) hearing aids is avoidable. At the University Clinic it is possible to measure the remaining hearing precisely: to estimate from the audiometric graph and from specially devised spoken tests of hearing whether an ' aid ' can help the patient, and if so, what form of aid is best. If no aid is any use, as sometimes happens, the patient is saved useless expense. Part of the work of the Department has been the detailed examination by scientific methods of the effectiveness of commercial hearing-aids. Information has been gathered in this way, which is nowhere else to be had, about the precise performance of most commercial types of aid, and the Department is therefore able to give the best possible advice to patients for whom aids are of any use. Incidentally, some commercial aids were found actually to *increase the patient's handicap* by reducing the strength of some of the sounds of speech instead of amplifying them !

If aids are found to be of no use there remains still the help to be got from the art (for art it is) of lip-reading. The authors examine in detail the difficulties of acquiring it, and offer much useful advice about its acquisition and practice : advice of more than ordinary value since it comes from the personal experience of one of the authors who has to rely largely upon lip-reading. It must not, however, be supposed that lip-reading is merely the last hope of the totally deaf. Far otherwise. The authors stress particularly that practice should begin from the moment it is known that even slight deafness exists. It is easier to learn lip-reading before one loses hearing completely. The two function together, each helping the other ; and lip-reading plus the remaining hearing helps enormously to relieve the nervous strain of deafness, and to keep the environment as normal as possible. The results of the careful experiments detailed in Chapter II afford decisive proof of the superior help to be had from combining the two.

Deterioration of speech, in an adult who becomes deaf, may proceed so far that his utterances become almost, or quite, unintelligible. He not only is unable to hear others perfectly, but often cannot hear his own speech properly, and the absence of automatic self-correction through hearing leads to deterioration. Chapter IV examines this difficulty in considerable detail, and shows how the prescription of a suitable aid, after careful investigation of the individual defect; may go far to help in the retention of normal speech. Here also the patient must come half-way. " The majority of patients suffering from acquired deafness can only retain intelligible speech if from the onset of deafness they give thought to the subject."

We turn now to the much more difficult, but to the teacher and the psychologist the far more fascinating problem, of deafness as it affects children.

A deaf child may either have been born deaf, or may have acquired deafness subsequently ; and in either case it may vary in degree from only a slight impairment of hearing to total deafness. A child born totally deaf will never acquire either speech or language, unless taught by special methods, simply because he cannot hear the speech and language patterns around him. Apart from special education such a child grows up dumb—and his dumbness is just a consequence of his deafness. Chapter VII deals with the methods of detecting deafness in the pre-school child, a vital matter if his special education is to begin sufficiently early to be really effective; and Chapters XII and XIII discuss at considerable length the principles, though not the detailed methods, which should govern his subsequent education.

It is especially interesting to note that in its early months a child born totally deaf has the same natural voice, and babbles naturally in just the same way as a hearing child. The authors point out that since babbling is an essential stage in normal speech development it is " important that a baby suspected of being deaf should be encouraged to babble and to use voice on every possible occasion. Babbling prepares the way for speech proper by facilitating the action of the organs of speech in a pleasurable way." Later the child will have to be taught speech artificially and anything of the natural tendency to speech that can be thus exercised and preserved will be very valuable.

" Mental development and speech development " in the normal child " hurry along hand in hand. They are inter-dependent." The authors examine in detail the stunting effect upon the whole development of the deaf child of the absence of the speech (i.e., spoken language) stimulus, and say " The main aim of the education of the deaf child is to give him words—to think with, to understand the thoughts of others, and to enable him to express his thoughts." Because of his handicap this can be done only by special and unusual methods. " . . . the acquisition of speech by a born-deaf child is such a vital and difficult matter that the scientific knowledge and art of the trained teacher is necessary from the beginning." The words " from the beginning " are all-important. The education of a child born deaf is so arduous a task and so hedged about with difficulties that any hope of reasonable success demands a start as soon as possible after the child is known to be deaf.

Happily however, not all children who are deaf enough to require education in a special school for the deaf are totally devoid of hearing. Ewing has shown from the examination of some hundreds of such children with a pure-tone audiometer that 72 per cent have some remnants at least of hearing: and it is in this field that Dr. and Mrs. Ewing and Dr. Littler have done what is perhaps their most remarkable work.

The *way* in which this 72 per cent are deaf varies almost infinitely. Some are only slightly or moderately deaf, but can hear over the whole scale of frequencies necessary for the *differentiation* of the sounds of speech, if near enough to the source of sound. Some are deafer to high notes than to low and *vice versa*—and many are *totally* deaf to high notes while hearing lower ones reasonably well. The significance of this cannot be understood until it is realised that every sound of speech is a combination of musical notes (more correctly, a combination of frequencies) occurring between Middle C and the C 1½ octaves *above the top* of the piano scale. In order to *differentiate* the sounds of speech, that is, to understand speech, one must be able to hear all the frequencies throughout this range. Deafness beyond the top of the piano scale, for instance, makes it impossible to hear ' s ' and ' th.' Deafness beyond the third octave above Middle C blots out most of the consonants : and deafness beyond the second octave makes even vowels almost entirely indistinguishable from one another.

These considerations, coupled with a study of the audiograms of deaf patients, led to the conclusion that the partially deaf child, according to the type of his deafness, is not hearing speech as we hear it, but as a horribly distorted sequence of sounds. In a mild case of high-frequency deafness, for example, a child may hear speech as we heard it a few years ago from early gramophones and loudspeakers—as if the speaker had a hot potato in his mouth—a hopeless pattern from which to learn either speech or language. In a case of severe high-frequency deafness the child would hear a sentence as merely a succession of undifferentiated noises for the vowels, punctuated by gaps of silence for the consonants.

The problem therefore was how to overcome the difficulty of the more or less complete nonsense which was all such children were hearing, to their utter mental confusion. The problem was not solely that of amplification, although amplification is usually necessary in varying degrees. The chief necessity is, if possible, to correct the distortion produced by the deafness, by introducing compensating and contrary distortion by way of an aid—much as an oculist corrects astigmatism. It appears that such a solution, though theoretically attainable, is not a practical possibility at the moment : but it *has* proved possible, by means of the very highest quality amplifiers that present-day science can provide, to give such children very effective help. The method devised has been named by the authors the " Hearing-Lip-reading Method," and it has been developed with considerable success. *No* aid yet devised can give perfect reproduction of speech : but a very near approach to such perfection is available in the electrical aids designed by Dr. Littler. By their means the child listens and lip-reads at the same time ; and the combination of what is heard (though still often imperfectly) with what is lip-read (plus expert specialist teaching of course) places the child in a vastly better position than if he had to depend on distorted hearing alone, or on lip-reading alone.

The basic idea behind the Hearing-Lip-reading method is, of course, that the greatest stimulus to speech comes through hearing—through hearing the voices of others, and to the deaf child especially, through being enabled to *hear his own voice.* It not infrequently happens that a partially deaf child hears his own voice for the first time by way of a hearing-aid. The teacher and the psychologist will perhaps have less difficulty than others in realising the mental awakening that follows such an experience; and even though the patterns heard be very imperfect, the stimulus to speech is invaluable. Using the Hearing-Lip-reading method the authors have obtained remarkable results, of which precise details are given in this book. But the justification of their methods does not rest on exceptional cases, gratifying and surprising as some of them are. The Hearing-Lip-reading method has been extensively applied in the schools for the deaf with very considerable success, even with pupils who, previously, would have been regarded and taught as totally deaf.

I am all too conscious that in spite of the length of this notice it has been impossible to do anything like justice to such an important work, and some sections of the book, as for example that dealing with the authors' important investigations into the relative attainments of deaf and normal children, have not been touched upon at all. Their work is so comprehensive and the book so concise that nothing short of a close study can possibly do it justice. For those whose work lies at all with the deaf, that study is a duty. I hope above all that the book will be read by School Medical Officers, upon whom devolves the onerous duty of detecting deafness as early as possible and advising suitable educational treatment.

F. W. COCKERSOLE.

P.S.—The book includes an appendix on the Vocational Training of the Deaf, by J. S. Spalding, Head Master of the Royal Residential Schools for the Deaf, Manchester. A review of this will appear in the February, 1939, *Journal.*

OUTLINES OF RESEARCHES REPORTED IN THESES PRESENTED FOR HIGHER DEGREES OR DIPOLMAS.

THESE OUTLINES MUST BE SUBMITTED THROUGH THE HEAD OF THE DEPARTMENT IN WHICH THE RESEARCH WAS CARRIED OUT.

Effects of Practice upon Intelligence Tests.

Thesis submitted for the M.A. Degree in Psychology, London (University College, 1938).

By K. J. DAVE.

THE chief aim of the experiment was to determine the effects of practice upon the scores, variability and intercorrelations of various group tests of intelligence. For this purpose four test batteries, each consisting of ten sub-tests, were prepared. The tests were given to seventy-five children at intervals of about seven days, and again to 100 children in another school some months later. In the former school the children were divided into three classes, and were given three test batteries in cyclic order. In the latter school they were divided into four classes with the consequent employment of all the four batteries. Gains made during the different trials of the two experiments were calculated as percentage increase over initial scores and tests were compared as to their relative degree of improvability. The two spatial tests, viz., spatial analogies and spatial classification, showed an improvement of about 26 and 47 per cent respectively after practice. Equations test increased 11 per cent. Of the verbal tests, synonym-antonym test improved the most, viz., 34 per cent. Analogies, mixed sentences, and comprehension showed respectively an increase of 16, 17 and 7 per cent only. Non-verbal tests, on the whole, seemed to show a greater degree of improvement than the verbal tests. The variability of the tests was measured in terms of coefficient of variation. It showed a decrease after practice in the case of tests which were highly improvable. But in the case of those which were less improvable it showed no constant tendency of decrease or increase. Intercorrelation between the tests showed a small increase during the first experiment, but a decrease in most cases during the second. It averaged respectively ·40, ·39 and ·44 during the three trials of the first experiment, and ·39, ·39, ·34 and ·34 during the four trials of the second. This makes it difficult to decide whether practice increases or decreases the intelligence-measuring value of tests. Decrease in correlation during the second experiment may to some extent be accounted for by such factors as insufficiency of room for improvement at the upper end of test scales in respect of the cleverer children of the second school, or, inequality of practice in general. But it may also be the case that practice works in two different directions. By bringing about some amount of uniformity among subjects as regards specific factors, it may increase correlations. But by differentiating subjects as regards various abilities possessing their own individual nature, it may also decrease them. However, more evidence than is now available is necessary to support this suggestion.

Children's Conceptions of Adult Life.

Outline of Thesis presented for the Diploma in Psychology
(University College, London, 1938).

By PHYLLIS M. FREESTON

THE research was carried out on over 900 elementary school children, aged 5 to 13. The child was first asked to draw a picture of himself as he would be when he was grown up, and then (in the case of those over eight) to write an account of the chief differences between boys (or girls) and grown-up men (or women). The whole was supplemented by a systematic questionnaire.

The characteristics inserted in the drawings or mentioned in the writings were tabulated according to sex and age. The development of the child's conception of adult life could thus be studied quantitatively. At five nearly half the children (42 per cent) distinguished the adult by a difference in size and dress; at nine practically all (91 per cent) introduced such differences. On the other hand, indications of a definite profession or vocation were not common before thirteen. At eight, 60 per cent of the writers referred to physical differences but only 29 per cent to mental differences; at thirteen the emphasis was reversed (69 and 85 per cent respectively). Among the many unexpected conclusions that may be drawn, the following, perhaps, may be specially noted: the younger children were far more apt to choose for themselves trades or professions which they might conceivably enter; the older, although ranging more widely, were more apt to depict themselves in attractive careers or impressive situations which were quite outside the range of actual possibility.

Types of Fear.

Outline of Thesis presented for the Diploma in Psychology
(University College, London, 1936).

By H. F. CAMPBELL

HITHERTO Burt's method of correlating persons has been chiefly applied to comparing individual preferences; it may be equally used for comparing individual antipathies or dislikes. As part of a co-operative investigation on the group-factors underlying different instincts or emotions, questionnaires were circulated to 350 school children and fifty-four adults, asking them to arrange certain objects or situations in order according to the degree to which they disliked them: the essential items were objects or situations likely to arouse anxiety or fear; but other topics were freely intermingled to camouflage the real aim of the inquiry. The fear-reactions of a class of infants (thirty-seven boys and girls aged five to seven) were also recorded for a period of two years (1934-36), and similar rankings made for each individual by an outside observer. The orders were correlated, and a factor-analysis by least squares carried out. The variance for the first (or 'general') factor averaged ·39, and for the second factor ·23—both statistically significant. The second factor is bipolar, and tends to sort the individuals into two antithetical types—those who were mainly afraid of *physical* dangers and of *personal or social* situations respectively. A continuation of the research, carried out on neurotic children, indicates that the method would be of service in diagnosing and classifying cases of anxiety neurosis and kindred conditions.

BOOK REVIEWS.

Recent Experiments in Psychology: By Leland W. Crafts, Theodore C. Schneirla, Elsa E. Robinson and Ralph W. Gilbert. 8vo, pp. xiv+417. (London: McGraw-Hill Publishing Co., Ltd., 1938. 12s. 6d.)

This volume, compiled by four teachers of psychology in Washington College, New York University, contains a series of accounts of recent researches which have been chosen by the authors as representative of contemporary trends in psychological science. Since it is intended both for the college student and for the public at large, the authors have selected from the large amount of available literature topics of general interest and scientific importance; and they have been remarkably successful in presenting the problems attacked by, the methods employed in, and the results obtained from, the experiments they describe in a simple and clear expository form that will make for easier reading and better understanding than many of the original reports as communicated to the journals. They have accomplished this by defining technical terms when necessary and simplifying them where possible, by giving full accounts of the methods followed in the various experiments, by concisely summing up the conclusions to be drawn from them, and by the use of ample illustrative material.

The scope of the volume covers a very wide field, embracing topics of animal, primitive, child and pathological behaviour as well as that of "normal" adults; and it includes problems bearing upon various aspects of cognitive, conative and affective processes.

Two chapters deal with matters that are not experimental, the one on organic nervous disease, the other on the breaking of undesirable habits. The first of these will interest the student of psychology as showing the effects of some nervous disorders upon behaviour; but it may be doubted whether it will be helpful to the general reader. The inclusion of the second, the subject of which is undeniably of the greatest importance, is justified by the practical use to which its suggestions may be put. Three chapters on research that has led to negative results appear very appositely in this volume since they show how exact methods of experimentation often cast doubt upon widely entertained popular beliefs. Two of these have to do with facial expression; there is no experimental evidence that one can either safely judge the emotional experiences undergone by others by their facial appearance, nor is there any such evidence that vocational aptitudes and successes, as has often been claimed, can be estimated from a study of photographs. Similarly, experimental evidence is lacking for the common opinion that a person's character traits can be deduced from his handwriting.

As might, perhaps, be expected, *Recent Experiments in Psychology* has a somewhat behaviouristic slant, emphasis being placed upon the physiological causes (or concomitants) of the several mental processes with which it deals. The book begins with an account of Kuo's experiments, which were planned to investigate the origin of the cat's reactions to rats and mice; and it ends (if we neglect the final two non-experimental chapters) with the experiments of Jacobson and of Max which, it is claimed, lend support to the motor theory of thinking. It should not be understood, however, that the authors accept the motor theory uncritically; for, while they take the data yielded by these investigations as supporting evidence, they do not regard them as providing definite proof. Thought may depend upon muscular activity; on the other hand, muscular activity though not necessarily overt, may be an invariable effect of thinking.

Social Behaviour and Child Personality: by L. B. Murphy. (Columbia University Press, pp. 333. 17s. 6d.)

As the sub-title explains this is "an exploratory study of some roots of sympathy." The main part of the book gives an account of systematic observations on the sympathetic behaviour of nursery school children. Specially important chapters deal with the varieties of sympathetic and unsympathetic behaviour, and quantitative relations between sympathetic behaviour and other aspects of social behaviour. One point brought out clearly, though not perhaps a new one, is that there is some correlation between positive or active sympathy and aggression. The sympathy of some children takes the form chiefly of active aggression on behalf of the injured one.

The enquiry provides further evidence in favour of the specific nature of such an innate tendency as sympathy and of its variation from one period to another. For example, the children of from two to three years of age do not in general respond sympathetically to "black and blue wounds; swellings; lumps and other minor distortions of flesh which to an adult would suggest discomfort or illness; Red Riding Hood being eaten up by the wolf; pictures of accidents; funerals; being crippled; carrying crutches, etc., traps." On the other hand, "the three-year-olds have responded generally, though not universally, to people whose distress involved bandages; blindness; injuries coloured with mercurochrome of iodine; red swellings, scars, scratches, etc., deprivation of toys, food, or of mother; a physical dilemma—being caught in a pen, bicycle, box, etc.; interference of activity to child, having to stay in bed, not being able to run and play, etc.; frustration in activity, attack by another person; incompetence to do a job undertaken; accident, such as a fall, etc.; crying." Again, we find among such children, as indeed we do among adults, that we cannot speak of the individual as being generally sympathetic or aggressive, but that these tendencies are called forth by some people and not by others, by certain situations and not by others. In her theory of the growth of sympathy Dr. Murphy is cautious and undogmatic. It is not clear how far she agrees with McDougall's theory of "sympathetically induced emotion"; she seems to quote with favour Allport's comments to the effect that "common observation indicates that sympathetic response varies with the sympathizer's previous experience," whereas McDougall's theory of sympathetically induced emotion would suggest that *any* expression of feeling would arouse sympathetic response in the observer. This does not seem to me necessarily to follow, nor, in fact, does observation suggest that sympathetic response is coincident with the sympathizer's previous experience. Surely in many cases, at least, it goes far beyond it.

The unwillingness to recognise some innate tendencies that the child will exercise—play with, as it were—lands us in other difficulties. For example, it is suggested that the child's mothering of younger children may sometimes be interpretated as a compensation for its own inadequate mothering, and at other times as a representation reproducing the satisfying experience of that mothering.

The discussion tends at times to be carried on in unnecessarily abstract terminology, but undoubtedly the book makes a valuable contribution to the detailed study of this aspect of the development of a pre-school child.

Psychology in Everyday Life: By WALTER C. VARNUM. (McGraw-Hill Publishing Co., Ltd., pp. 434. 15s.)

This is a text-book for non-professional students of psychology. The writer begins by giving a definition of psychology and goes on to show how it may be applied to industry, education, and personal adjustment to life. As the writer's standpoint is that of the behaviourist a good deal of stress is laid on the physiological and neurological bases of action. Accounts of various types of experiments are given, including simple laboratory tests, tests of intelligence and educational attainment, and industrial and vocational tests. Careful tables of results are given and there is a brief explanation of the statistical devices used in calculating these results. At the end of each chapter is a series of questions set as a test from which the reader can discover how much he has gained from the chapter.

In his anxiety to show that psychology is a science the author has rather overemphasised the importance of mechanical tests and has exaggerated the individual's power of detachment without which many of the self-administering tests suggested would be unreliable. Nevertheless the book covers a wide field with clarity and conciseness, and the account of the experiments is interesting.

The Psychologist at Work: An Introduction to Experimental Psychology: by M. R. HARROWER, Ph.D. (Kegan Paul. 5s.)

Written for the general public, this book gives a simple and straightforward account in a conversational style, of the type of experiment carried out by the psychologist in the laboratory, and shows the importance of these experiments in the study of the human mind. Problems of vision and of hearing, of learning and of emotional reaction are dealt with, helpful illustrations and diagrams are given, and there is a useful bibliography at the end of each chapter.

The writer's point of view is that of the gestalt psychologists and there is a short preface by Professor Koffka, but reference is also made to the work of other schools, particularly to that of the behaviourists.

Although writing in a popular style, the author repeatedly lays emphasis on the fact that psychology is a science and not a kind of white magic, and the importance of carefully controlled experimental conditions is made clear. The book should prove a useful introduction to Experimental Psychology for the student as well as an interesting account of modern methods in psychology for the general public.
M.C.P.

Social Psychology: By DANIEL KATZ and R. L. SCHANCK. (John Wiley and Sons (New York) and Chapman and Hall (London), 1938, pp. xiv+700. 18s. 6d.)

Every writer of a text-book on social psychology must solve the problem of how far he can make his book a record of what has been established by exact observational and experimental study and what part of it must depend on systematisation of common observation. The authors of this book use both methods (as is necessary if the scope of the treatment is not to be unduly narrow). The main difficulty in making a systematic study of social psychology is to avoid making the experimental part trivial and the part based on common observation common-place. The authors do not seem to be altogether successful in avoiding these dangers. There is much uncritical presentation of researches in social psychology of doubtful value and importance. Discussion of more general social questions does not appear to be sufficiently well-informed to throw any new light on them.

It is, on the whole, a disappointing book.
R.H.T.

Adolescent Psychology: By ADA H. ARLITT. (London, George Allen and Unwin, Ltd., pp. 242. 6s. net.)

Dr. Arlitt has written an attractive and useful little book on the psychology of adolescence. Her approach has been mainly to give a résumé of such knowledge of adolescence as may be necessary to teachers of adolescent boys and girls. In this she is successful for she includes much useful knowledge of the physical and emotional life of the adolescent; summarises the present position regarding intellectual development of adolescence and finishes with a discussion of personality and disturbances in personality during adolescence.

The book takes its place on the shelves with many others of a similar nature. It contains nothing that is original, but it gives a survey of adolescent psychology and thus is a useful book for students, teachers and social workers whose interests are with young men and women.

Human Affairs: Planned and Edited by R. B. CATTELL, J. COHEN, and R. M. W. TRAVERS. (London, Macmillan and Co., Ltd., pp. 360. 10s. 6d.)

This book is the result of a plan which originated with the three young psychologists who appear as editors. The sub-title of the book gives a general idea of what the editors had in mind, "An exposition of what science can do for man." They have been successful in organising an extremely interesting and instructive experiment in publishing this volume. The team of contributors includes Professor J. B. S.

Haldane, Professor David Katz, Dr. Havelock Ellis, Professor W. McDougall, to name but a few. All the articles reach a high standard of excellence and readers of this *Journal* will appreciate the contributions of Professor Katz on "Psychological Needs"; of Mr. E. Chambers on "Psychology in the Industrial Life of the Nation"; and of Dr. Cattell's "Education and the Sciences of Human Nature."

The volume will be widely read, and will provide material for much thoughtful discussion.

New Frontiers of the Mind: By Dr. J. B. RHINE. (London, Faber and Faber, Ltd., pp. 298. 7s. 6d. net.)

Dr. Rhine has placed students of psychology still further in his debt, for in this volume he has reported simply and non-technically the progress that has been made in the experiments at Duke University since the issue of his earlier volume on Extra-Sensory Perception. The results reported are fascinatingly interesting; the implications involved are decidedly important. The experiments are carefully described and the results obtained by similar methods elsewhere are considered. The book will give another impetus to research in this comparatively new field in experimental psychology.

Some Suggestions towards a Revised Philosophy of Education: By JOHN MACDONALD. (Oxford University Press, pp. 25. 1s. 0d.)

In this, the fifth John Adams Lecture, delivered at the Institute of Education, Professor Macdonald, considering the question of education in a democratic society, takes as his thesis the view that the life-blood of democracy is co-operative thinking, the finding, through discussion, of the best collective thought. The school cannot do very much in a direct way to create this co-operative thinking. Indeed, the special function of the school is not to do this, but to instruct, in the sense of "enlightening" man concerning the nature of the conditions and the influences that determine his life and developing in him the power to control these conditions; for man has the making of human society in his own hands. With a view to such "enlightenment" the core of the curriculum should be science, art, and the study of man in his social and political relations, because they are the essential values on which our civilization rests.

The task of training the individual for the co-operative group life that democracy implies is not one for the school, but is to be achieved in two ways: first, by way of associations (such as learned societies, trade unions, philanthropic associations) already present in society and suitable for the purpose; and, second, by effecting such changes in the organisation of society as will cause social life (including the industrial system) to be permeated with co-operative thinking and co-operative effort and ensure that education will not be side-tracked or stultified.

Education for democracy will not succeed if we delegate the task of producing the perfect individual to our schools, and leave society to go its own way; for the problem of producing an ideal individual is intimately bound up with the problem of creating an ideal society. After all, the sense of values in the young is determined predominantly, not by the values to which the school invites their allegiance and the grown-ups outside the school render more or less eloquent lip-service, but by the values with which these grown-ups are themselves seen to be most strenuously concerned. The school, therefore, is not to be asked to make good the omissions of society; rather must society make good the inevitable omissions of the school. This policy means the reversal of that modern philosophy of education, associated with Dewey, which would make of the school a miniature replica of society, on the assumption that the family is fated to disappear as an educational agency and that the school should provide the remedy for every fault in the up-bringing of the young.

This is a bald summary of the suggestions by means of which Professor Macdonald set out to stimulate his hearers, and his readers, to consider some of the main problems in the philosophy of education. His conclusions, and no less his arguments, set forth in a most attractive manner, are certainly at once a stimulus and a challenge to serious thought. G.H.T.

Children's Dreams: an Unexplored Land: By C. W. Kimmins. (George Allen and Unwin, 1937, pp. 121. 4s. 6d. net.)

This book gives an excellent account of the studies by Dr. Kimmins of the dreams of school children between five and eighteen years of age. Over 5,000 dreams were studied. Although the major portion of the book is concerned with the normal child, there are also chapters on the dreams of blind, deaf, and physically-defective children, and also of children in industrial and reformatory schools.

The dreams of children of eight years of age and over were recorded by the dreamers themselves without preliminary preparation. This was done with a power of graphic description much in advance of that shown in ordinary essay-writing. All would agree with the author that this aspect is worthy of further investigation.

Many of the dreams were recorded soon after the Great War. Others were recorded more recently. The following elements have been singled out for treatment: " Types of wish-fulfilment and fear dreams; kinæsthetic dreams; references to fairy stories; compensation dreams; dreams of bravery and adventure; school activities; cinemas; exciting books and death incidents; dreams in which conversations are recorded; and the presence of other witnesses than the dreamer." The author is thus able to classify the types of dreams peculiar to children of different ages.

In his chapter on the nature of the dream the author refers briefly to the works of Freud, Rivers, Watt, Bergson, Stern, Havelock Ellis, Piaget, and Arnold Forster. There is an instructive but all too brief chapter on the day-dream. The last chapter discusses the educational value of the dream.

Altogether there results a large crop of interesting conclusions. Thus who could have suspected that in the dreams of the deaf and the blind children the fear of animals is greater than among ordinary children, and in the case of the deaf it is twice as great as in that of the blind? As the author has also obtained records of dreams, written under the same conditions, from children in American, French, and German schools, he points out a promising field for future investigators, namely, the child's attitude to life under varying types of environment.

The book may be warmly recommended not only to the teacher or to the student of dreams, but also to the general reader.

LL.W.J.

Studies in the Psychology of Art Vol II: Edited by Norman C. Meier. (Published [illegible] Review Company, Princeton, N.J., pp. 175.)

This book is also No. 19 of the *University of Iowa Studies in Psychology* and Vol. 48 of the *Psychological Review Monographs.*

The volume gives the records of eight enquiries dealing with artistic appreciation and ability in children. The first of these, by Mildred D. Voss, deals with the conditions affecting art appreciation and concludes that the principles of art can be grasped and applied by children in the second, third, fourth and fifth grades, and that this produces an improvement in " the ability to judge between varying degrees of merit." On the other hand, with complete " cessation of the type of activities provided by the experimental procedure over a considerable period of time, there is failure to progress to a sufficient extent so that the experimental group retains a significant superiority over the control group."

The second study, " Empathic Responses of Children," by W. E. Walton, shows that the empathy response may reveal itself even in kindergarten children if one takes such things as " saying which of two lines is lazy and which happy," as a proof of empathy. The article by A. W. Saunders on the stability of artistic aptitude gives some hope that by special training, both theoretical and practical, even children who seem at the outset to be lacking in artistic ability may make some progress; but it makes clear also that the amount of progress is limited by the initial capacity. Other articles deal with the measurements of quality in children's paintings by the scale method; artistic ability and general intelligence; art ability without instruction or environmental background, and an "instrument for the study of creative artistic intelligence." The whole volume makes a useful contribution to the experimental study of æsthetic development in children. In view of the difficulty of research on æsthetic appreciation one must not be surprised if there are weak parts in the experimental scheme at times; but there is some breaking of new ground here, and every advance makes things easier for subsequent workers.

Child at Play: By MARJORIE THORBURN, with a foreword by SUSAN ISAACS. (George Allen and Unwin, Ltd., pp. 187. 6s.)

This is a careful and well-written record of the observations by a mother of the play of her own little girl during the first four years of life. In addition to the general study of these four years there is a much more detailed record of the period from 3 ; 2 to 3 ; 5. This period, indeed, covers about 100 pages, whereas the general survey covers only fifty. The book provides very useful material for the student of children's play during this period.

The relationship between the little girl and her young baby brother furnish further interesting material. Mrs. Thorburn's records are unusually exact. She is not content with vague generalities; in most cases the exact words spoken by the child being reported. This detailed record is only made possible by the constant attention of a mother keenly sympathetic with the little child's point of view.

In her final chapter on "Notes on the uses of material," Mrs. Thorburn gives a few of her own interpretations, some of which go beyond what the material would justify. She expects very much indeed of play as one of her concluding paragraphs shows: "The child is dealing with all the problems of the universe; its play may even teach us laws which we have not yet discovered for ourselves. Perhaps, above all, we may learn something more of that ever-puzzling relationship between matter and spirit which is summed-up in the word 'incarnation.'"

C.W.V.

The Adolescent: By ADA HART ARLITT. (McGraw-Hill Publishing Co., Ltd., pp. 242. 8s. 6d.)

The thesis of this book is that most of the problems of adolescence have been accentuated, if not created, by modern civilisation. In primitive societies the individual passes swiftly from childhood to adult life after undergoing the initiation ceremonies of the tribe. In civilised life the transition period is longer and is made more trying by adults who at one moment treat the adolescent as a child and at others as a grown-up according to the adult's own caprice, and without reference to the feelings of the adolescent; and by the fact that there is often little agreement amongst the adults of any social group regarding the degree of liberty to be granted to the adolescents. The writer tries to give the parent increased understanding of the adolescent by outlining the emotional and intellectual changes which are taking place at this time, and pleads for greater thought to be given to the planning of both school time and holidays, so as to give the adolescent opportunities of experimenting and discovering his own abilities without continual criticism, and without undue strain. Discipline and character training are discussed, and emphasis laid on the adolescent's need for a feeling of security.

There is little that is new in the book and there is a good deal of repetition. To the psychologist many of the truths stated are platitudes, but the book is easy to read and may suggest new lines of approach to their problems to some who are worried by the "difficult" behaviour of adolescents who in earlier childhood had been quite docile.

Advances in Understanding the Adolescent: Compiled by the Home and School Council of Great Britain. (1s.)

This is a companion volume to the earlier publication of the Home and School Council—"Advances in Understanding the Child." It consists of papers by different specialists on the various aspects and problems of adolescence, ranging from Health and Habits (including suggestions on diet) to Intellectuality, Leisure and Religion. There are also nine outlines for Study Group discussions on the problems raised in the different articles.

The language used is simple and non-technical, addressed to the parent and teacher to whom the book should be both helpful and thought-provoking. Each writer gives his or her own point of view, and while this may be a little confusing at first, it helps the reader to see something of the complexity of the problems involved and should prevent a biassed outlook. The writers all emphasise the need for tolerance and understanding in dealing with the adolescent, but, as Dr. MacCalman says in his Foreword, " Tolerance can only come through wisdom and wisdom through knowledge " ; the writers do much to pass on the knowledge they themselves have gained from their wide experience, and the book will be welcomed by all those interested in the problems of adolescence.

A Pediatrician in Search of Mental Hygiene: By BRONSON CROTHERS, M.B. (Humphrey Milford, pp. xix+271. 8s. 6d.)

This practical book is particularly concerned with the assignment of responsibility for the mental hygiene of children attending hospitals and clinics. The discussion is of great interest, especially as problems exist in England so similar to those in America.

Professor Crothers presents every point of view, but considers that the Pediatrist should be trained to assume control of the mental as well as the physical treatment of the child, rather than handing the former part over to the Psychiatrist. The general practitioner is dismissed rather briefly, but the importance of trained lay workers is emphasised.

A unit at the Children's Hospital in Biston is described, and the book ends with a summary of guiding points in the organisation of a scheme for mental hygiene in pediatrics.

One wonders why the author always refers to the psychologist as a woman?

W.H.V.

Preface to Teaching: By H. W. SIMON. (Oxford University Press, New York and London. Published in England by Humphrey Milford. 6s. 6d. net.)

Dr. Simon has written a very useful introduction to teaching. He has the facility of writing easily and well on a subject which is apt to be dealt with in a manner which is, to say the least, not very encouraging and interesting to the novice. The author has thought deeply about the teacher and the teachers' art. He is not afraid to state his views, even if these are not always generally held. His book is divided into two parts, " What the job is " and " How to do it." The volume can be thoroughly recommended. Many experienced teachers might gain much from a careful reading of the pages.

Dr. Flexner contributes a very interesting foreword, in which he appeals for the realisation of the importance of humour in teaching.

Apsa: By CHARLES T. SMITH. (London, Watts and Co., pp. 581+xxix. 21s. net.)

The author of this large and imposing volume is known to many teachers and others interested in educational experiments and progress through two earlier but much smaller books on *The Music of Life* and *The School of Life*. These two books gave promise of still greater things in the future, and in Apsa one finds the further realisation of Mr. Smith's hopes and efforts in bringing about many very desirable changes in educational ideals, plans and methods. The book is, in part, a description of an experiment carried out in a London elementary school and also a critical examination of the English Educational System, with many valuable suggestions for its modification.

A short review of such a book cannot possibly do justice to it. The volume should be carefully read by teachers and administrators. Mr. Smith is to be congratulated on his courageous experiment, and one hopes that his efforts to interest many other teachers in his ideas will meet with the success they richly deserve.

Ruth: Tagebuch über die Entwicklung eines Madchens: von **Vilhelm Rasmussen**. German translation by **A. Rohrberg**. (R. Oldenbourg, Munchen, pp. 300.)

This translation from the Danish, though published several years ago, has only recently been received for review. It is a record of observations made by the author and his wife on their elder daughter "from birth to the eighteenth year." (Readers should distinguish it from Rasmussen's *Diary of a Child's Life* which referred to the younger daughter, and was reviewed in this *Journal* some years ago.)

The book contains a great deal of material of interest to students of child psychology, and it is of special value to have the records continuous from the first year through adolescence. Dr. Rasmussen's manner of recording indeed is more suited to the period after the first year or two.

In the later years the records are sometimes exceedingly frank, and they are particularly full of the expression of the girl's ideas on many topics. Miss Ruth, however, can hardly be distressed at being described so openly in public, for she appears as a very charming damsel, with an I.Q. of at least 140, and, as the many sketches of hers show, a promising young artist.

C.W.V.

Emotional Episodes in the Child of School Age: By **W. E. Blatz, S. N. F. Chant**, and **M. D. Salter**. (The University of Toronto Press, pp. 45.)

The enquiry described in this booklet was based chiefly upon the reports of teachers on the emotional episodes sufficient to interrupt class work. The episodes were classified under fighting, excessive timidity, impertinence, sulkiness, and temper tantrums, 1,580 children in the city public schools being included in this part of the enquiry. Nothing very startlingly new comes out of the research. The decline in the frequency of emotional episodes with chronological age is made fairly clear, with the exception of a temporary rise at the age of ten. This temporary rise is still slighter if one takes mental age instead of chronological. (We are leaving out of count the figures for the oldest age group in which the numbers were decidedly less.) There was some indication of more frequent emotional difficulty among the less intelligent children and the children of the highest intelligence quotient. In a girls' school camp, where, however, the numbers were not more than 159, there was no such increase in the number of emotional episodes among children with a very high I.Q. as there was at the school.

OTHER PUBLICATIONS RECEIVED.

Narrative Muse, Parts I, II: V. Collins and H. Treble, pp. 191. (Oxford University Press.)
Guerre Civile: J. Bede and R. Cook, pp. 132. (Macmillan.)
Contes d'Aventure et de Mystère: N. W. H. Scott, pp. 135. (Macmillan.)
Tables for Qualitative Analysis: J. Bruce and H. Harper, pp. 29. (Macmillan.)
Passages from German Authors: Ella Spiere, pp. 184. (Macmillan.)
The Groundwork of Précis: S. Glasey, pp. 158. (Oxford University Press.)
Exercises in Literary Appreciation: F. T. Wood, pp. 161. (Macmillan.)
Letters of Horace Walpole: A. Pink, pp. 282. (Macmillan.)
Shorter Poems of John Milton: B. A. Wright, pp. 208. (Macmillan.)
Introduction to Biology: E. Hatfield, pp. 524. (Oxford University Press.)
Essentials of School Algebra: A. B. Mayne, pp. 500. (Macmillan.)
World Geography: E. O. Robinson, pp. 543. (Macmillan.)
School Book of English Verse: G. Boas, pp [illegible]
L'Enigme du "Redoutable": J. H. Roasn [illegible]
Elementary Inorganic Chemistry: S. J. S [illegible]
New Latin Course: H. Gould and J. White [illegible]
Psychology and Religion in Early Childhood [illegible] hristian Movement Press.)